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Topographic and Geologic Survey of Pennsylvania

RICHARD R. HICE, State Geologist

Report No. 11.

The Mineral Production of Pennsylvania

FOR THE YEAR
1913

HARRISBURG, PA.;
WM. STANLEY RAY, STATE PRINTER
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THE MINERAL PRODUCTION OF PENNSYLVANIA IN 1913.

The mineral production of Pennsylvania in 1913 far exceeded that of any previous year, exceeding the previous high record by more than $60,000,000.

In 1911 the total value of the mineral production of Pennsylvania, excluding pig-iron, coke and other derived products, was $414,426,962. In 1912 this total value rose to $445,790,022, and in 1913 the total was $506,466,759, being 24.7 per cent. of the entire output of the United States.

Since the first tabulations of the mineral production of the United States were made, Pennsylvania has stood at the head of the list. It occupies an unique position in that respect inasmuch as it so greatly surpasses the value of the output of any other state. This production exceeds in value the combined output of Illinois, West Virginia, Ohio and California, the four next producing states as regards the value of their mineral output by $8,500,000.

While it must be admitted that Pennsylvania holds this unique position on account of the enormous value of its coal output, which in 1913 was $388,220,933, yet it must not be overlooked that if the entire coal output of the United States is disregarded that Pennsylvania still leads as a mineral producer, exceeding California, which would be the second state, in 1913, more than 15 per cent.

The following table gives in brief the quantity and value of the several minerals and mineral products produced in Pennsylvania in the year 1913, and the comparative production for the years 1904-1912.

There being less than three producers of some of the lesser minerals, the figures are concealed to prevent disclosure of individual output.

OUTPUT AND VALUE OF THE MINERAL PRODUCTS OF PENNSYLVANIA, 1904 to 1913.

Product.	1904.		1905.		1906.		1907.		1908.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cement, natural, barrels,	770,897	$298,533	748,057	$306,555	744,403	$560,534	625,871	$263,969	252,479	$87,192
Cement, Portland, barrels,	11,496,099	8,969,206	13,813,487	11,195,940	18,645,015	18,598,439	20,393,965	19,698,006	18,254,806	13,899,807
Clay products,	.....	16,821,863	.....	19,124,553	.....	21,774,611	.....	20,291,621	.....	14,842,982
Coal, Anthracite, long tons,	65,318,496	138,974,020	69,339,152	141,879,000	63,645,010	131,917,694	76,432,421	163,584,056	74,347,102	158,178,849
Coal, Bituminous, short tons,	97,952,267	94,434,219	118,413,637	113,390,507	129,293,206	130,290,651	150,143,177	155,664,026	117,179,527	118,816,303
Copper, pounds,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Feldspar, short tons,	21,077	146,154	.....	.....	.....	.....	19,633	136,847	14,089	103,502
Glass sand, short tons,	294,333	346,370	361,829	482,937	342,967	510,910	370,977	489,989	405,028	484,353
Graphite,	.....	.....	.....	.....	.....	.....	1,674,000	51,960	356,000	16,740
Iron ores, long tons,	397,107	611,211	808,610	1,060,162	949,479	1,246,267	837,287	1,298,717	443,161	572,346
Iron, pig, long tons,	7,644,321	.....	10,579,127	177,099,000	11,247,869	.....	11,348,549	234,952,000	6,987,191	111,385,000
Lime, short tons,	567,300	1,537,673	620,018	1,672,267	624,060	1,857,754	655,166	2,075,842	582,352	1,883,496
Metallic paint and mortar colors, short tons,	7,710	107,609	8,596	123,570	11,021	136,083	10,327	127,973	9,197	113,112
Millstones,	.....	1,494	.....	1,351	.....	2,624	.....	2,016	.....	1,073
Mineral waters, gallons sold,	743,050	90,465	1,322,594	194,113	1,506,286	280,054	1,287,063	235,807	1,430,482	180,889
Natural gas,	.....	18,139,914	.....	19,197,336	.....	18,558,245	.....	18,844,156	.....	19,101,944
Ocher, short tons,	4,077	29,355	7,789	72,360	8,597	79,244	8,047	76,816	9,386	78,956
Petroleum, barrels,	11,125,762	18,222,242	10,437,195	14,653,278	10,256,893	16,596,943	9,990,306	17,579,506	9,424,328	16,881,194
Sand and gravel, short tons,	1,843,405	934,224	3,666,975	1,753,372	4,889,908	1,969,901	5,428,471	2,292,571	3,725,414	1,718,703
Sand lime brick,	.....	20,495	.....	63,226	.....	62,921	.....	48,410	.....	64,123
Slate,	.....	3,650,246	.....	3,491,905	.....	3,522,149	.....	3,855,010	.....	3,902,978
Stone,	.....	7,341,180	.....	7,956,177	.....	8,804,776	.....	9,132,372	.....	6,371,152
Clay,	196,977	323,624	235,510	406,388	.....	572,331	.....	618,143	.....	466,385
Other products,	.....	.....	.....	6,339,386	.....	.....	.....	6,874,095	.....	4,951,276

OUTPUT AND VALUE OF THE MINERAL PRODUCTS OF PENNSYLVANIA, 1904 to 1913.—Continued.

Product.	1909.		1910.		1911.		1912.		1913.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Cement, natural, barrels,	295,085	$98,673	196,331	$56,777	160,046	$48,096	.....	.....	a	a
Cement, Portland, barrels,	22,896,614	15,969,621	26,675,978	19,551,268	26,864,679	19,258,253	27,625,340	$18,945,835	c28,060,495	c$24,268,800
Clay products,	.....	21,186,713	.....	22,094,285	.....	20,270,033	.....	21,537,221	.....	24,231,482
Coal, Anthracite, tons.	72,374,249	149,181,587	75,433,246	160,275,302	80,771,488	174,952,415	75,322,885	177,622,626	81,718,680	195,181,127
Coal, Bituminous, short tons.	137,966,791	130,085,237	150,521,526	153,029,510	144,754,163	146,347,858	161,865,488	169,370,497	173,781,217	193,039,806
Copper, pounds,	.....	.....	740,626	94,060	611,621	76,452	a	a	503,792	78,088
Feldspar, short tons,	18,573	111,466	15,091	104,751	13,284	101,000	9,451	71,287	9,629	75,851
Glass sand, short tons.	281,120	399,707	434,147	617,200	478,089	668,247	427,936	517,383	513,867	674,073
Graphite,	2,098,000	116,466	1,392,767	82,194	1,490,000	80,300	a	a	393,817	19,242
Iron ores, long tons,	666,889	792,672	739,799	911,847	514,929	539,553	522,172	481,353	478,693	589,038
Iron, pig, long tons,	10,918,824	175,429,000	11,272,323	180,695,338	9,581,109	136,328,50	12,437685	b181,569,299	12,871,349	b197,726,314
Lime, short tons,	885,239	2,532,454	877,714	2,440,350	841,723	2,688,374	849,159	2,679,420	852,927	2,743,197
Metallic paint and mortar colors, short tons,	16,174	196,067	10,774	125,466	10,924	131,279	33,326	284,082	38,304	303,257
Millstones,	.....	.....	.....	.....	.....	.....	a	a	a	a
Mineral waters, gallons sold,	2,177,967	240,856	2,536,337	221,685	2,327,732	216,819	2,192,106	204,906	2,162,931	190,459
Natural gas,	.....	20,465,207	.....	21,057,211	.....	18,010,796	.....	18,539,672	.....	21,695,845
Ocher, short tons.	4,137	45,472	3,642	32,254	3,013	28,101	3,300	28,950	3,935	32,175
Petroleum, barrels,	9,229,403	15,424,554	8,794,662	11,908,914	8,248,158	10,894,074	7,857,948	12,886,752	7,963,282	19,805,452
Sand and gravel, short tons,	4,918,627	2,113,363	5,242,362	2,357,021	5,689,059	3,025,267	6,509,333	3,371,513	6,702,449	3,381,692
Sand lime brick.	.....	62,255	.....	72,827	.....	.....	.....	36,970	.....	73,674
Slate,	.....	2,892,358	.....	3,740,806	.....	3,431,351	.....	3,474,247	.....	3,733,581
Stone,	.....	8,125,723	.....	8,571,518	.....	8,147,505	.....	9,144,214	.....	10,117,469
Clay,	.....	644,411	.....	636,613	329,197	567,622	462,605	741,484	479,548	836,915
Other products,	.....	5,167,682	.....	4,473,836	.....	.....	.....	7,161,100	.....	d6,995,398

a Value included under "Miscellaneous."
b Value not included in total value.
c Exclusive of natural cement and Puzzolan, value for which is included under "Miscellaneous."
d Raw product included in derived product.

COAL.

The anthracite and bituminous coal produced in 1913 in Pennsylvania was almost equal in value to the entire mineral output of West Virginia, Illinois and Ohio, the second, third and fourth producing states as regards the value of their mineral output. The coal production of Pennsylvania so far exceeds that of any other state that it can only be compared with the output of foreign countries, and viewed in this way, the total production (aside from the United States) is only exceeded by that of Great Britain and Germany, the second and third producing countries of the world. The output of Pennsylvania is almost one-fifth of the entire production of the world.

The production of anthracite coal in 1913 was the highest of record, 81,718,680 long tons, exceeding the previous high record mark by almost 1,000,000 long tons in quantity.

The value at the mines of the anthracite coal was $195,181,127, exceeding the previous maximum value of 1910, by $20,228,712.

In the tables of the production of coal in the United States, the earliest record given is 22 tons of Pennsylvania anthracite, mined in the year 1814. In the report of the mineral production of Pennsylvania for 1911, data is given to show that coal was mined and shipped from the Wyoming Valley at an earlier date. It is impossible to show the actual production of these early years. It is also said that coal was mined in the Broad-Top field prior to the year 1800. This, of course, was for purely local use, and no accurate data is available.

The following table shows the production of both anthracite and bituminous coal in the United States and in Pennsylvania from the year 1814 to the close of the year 1913. In this century the total combined production of all coal in Pennsylvania is 5,178,641,069 tons, and the grand total for the United States is 9,844,247,843 tons. The portion produced by Pennsylvania being about 65 per cent. of the entire total for the United States.

PRODUCTION OF COAL IN PENNSYLVANIA AND IN THE UNITED STATES FROM 1814 TO THE CLOSE OF 1913.

Year.	Pennsylvania anthracite.	Pennsylvania bituminous.	Pennsylvania	United States. total.
1814,	22	.....	22	22
1815,	50	.....	50	50
1816,	75	.....	75	75
1817,	100	.....	100	100
1818,	200	.....	200	200
1819,	350	.....	350	350
1820,	450	.....	450	3,450
1821,	1,322	.....	1,322	1,322
1822,	4,583	.....	4,583	58,583
1823,	8,563	.....	8,563	68,563
1824,	13,685	.....	13,685	80,725
1825,	42,988	.....	42,988	117,988
1826,	59,194	.....	59,194	147,914
1827,	78,151	.....	78,151	172,151
1828,	95,500	.....	95,500	195,908
1829,	138,086	.....	138,086	240,086
1830,	215,272	.....	215,272	320,072
1831,	217,842	.....	217,842	337,942
1832,	447,550	.....	447,550	594,050
1833,	600,907	.....	600,907	734,657
1834,	464,015	.....	464,015	600,515
1835,	690,854	.....	690,854	824,854
1836,	842,832	.....	842,832	984,832
1837,	1,071,151	.....	1,071,151	1,253,651
1838,	910,075	.....	910,075	1,355,527
1839,	1,008,322	.....	1,008,322	1,560,360
1840,	967,108	464,826	1,431,934	2,070,039
1841,	1,182,441	475,000	1,657,441	2,291,141
1842,	1,365,563	500,000	1,865,563	2,610,067
1843,	1,556,753	650,000	2,206,753	3,060,874
1844,	2,009,207	675,000	2,684,207	3,681,252
1845,	2,480,032	700,000	3,180,032	4,309,904
1846,	2,887,815	760,000	3,647,815	4,865,522
1847,	3,551,065	399,840	3,950,845	5,286,067
1848,	3,805,942	500,000	4,305,942	5,773,974
1849,	3,995,334	750,000	4,745,334	6,448,831
1850,	4,138,164	1,000,000	5,138,164	7,018,181
1851,	5,481,065	1,200,000	6,681,065	8,734,525
1852,	6,151,957	1,400,000	7,551,957	9,816,664
1853,	6,400,426	1,500,000	7,900,426	10,570,288
1854,	7,394,875	1,650,000	9,044,875	11,977,102
1855,	8,141,754	1,780,000	9,921,754	12,926,673
1856,	8,534,779	1,850,000	10,384,779	13,546,925
1857,	8,186,567	2,000,000	10,186,567	13,340,189
1858,	8,426,102	2,200,000	10,626,102	13,974,478
1859,	9,619,771	2,400,000	12,019,771	15,633,175
1860,	8,115,842	2,690,786	10,806,628	14,610,042
1861,	9,799,654	3,200,000	12,999,654	16,488,012
1862,	9,695,110	4,000,000	13,695,110	17,485,835
1863,	11,785,320	5,000,000	16,785,320	21,319,002
1864,	12,538,649	5,839,000	18,377,649	23,605,123
1865,	11,891,746	6,350,000	18,241,746	23,792,173
1866,	15,651,183	6,800,000	22,451,183	29,003,583
1867,	16,002,109	7,300,000	23,302,109	30,724,422
1868,	17,003,405	7,500,000	24,503,405	32,861,960
1869,	17,083,134	6,750,000	23,833,134	32,904,360
1870,	15,664,275	7,798,518	23,462,793	33,035,580
1871,	19,342,057	9,040,565	28,382,622	46,885,080
1872,	24,233,166	11,695,040	35,928,206	51,453,399
1873,	26,152,837	13,098,829	39,251,666	51,602,480
1874,	24,818,790	12,320,000	37,138,790	52,605,920
1875,	22,485,766	11,760,000	34,245,766	52,348,320
1876,	22,793,245	12,880,000	35,673,245	53,280,000
1877,	25,660,316	14,000,000	39,660,316	60,501,760
1878,	21,689,682	15,120,000	36,809,682	57,935,600
1879,	30,207,793	16,240,000	46,447,793	68,105,799
1880,	28,649,812	18,425,163	47,074,975	71,481,570
1881,	31,920,018	22,400,000	54,320,018	85,881,030
1882,	35,121,256	24,640,000	59,761,256	103,551,189
1883,	38,456,845	26,880,000	65,336,845	115,707,525
1884,	37,156,847	28,000,000	65,156,847	120,155,551
1885,	38,335,974	26,000,000	64,335,974	111,160,295
1886,	39,035,446	27,094,501	66,129,947	113,680,427
1887,	42,088,197	31,516,856	73,605,053	130,650,511
1888,	46,619,564	33,796,727	80,416,291	148,659,657
1889,	45,546,970	36,174,089	81,721,059	141,229,513
1890,	46,408,641	42,302,173	88,770,814	157,770,963
1891,	50,665,431	42,788,490	93,453,921	168,566,669
1892,	52,472,504	46,694,576	99,167,080	179,329,071

PRODUCTION OF COAL IN PENNSYLVANIA AND IN THE UNITED STATES FROM 1814 TO THE CLOSE OF 1913—Continued.

Year.	Pennsylvania anthracite.	Pennsylvania bituminous.	Pennsylvania total.	United States.
1893,	53,967,543	44,070,724	98,038,267	182,352,774
1894,	51,921,121	39,912,463	91,833,584	170,741,526
1895,	57,999,337	50,217,228	108,216,565	193,117,530
1896,	54,346,081	49,557,453	103,903,534	191,986,357
1897,	52,611,680	54,417,974	107,029,654	200,223,199
1898,	53,382,644	65,165,133	118,547,777	219,976,267
1899,	60,418,005	74,150,175	134,568,180	253,741,192
1900,	57,367,915	79,842,326	137,210,241	269,684,027
1901,	67,471,667	82,305,946	149,777,613	293,299,816
1902,	41,373,595	98,574,367	139,947,962	301,590,439
1903,	74,607,068	103,117,178	177,724,246	357,356,416
1904,	73,150,709	97,938,287	171,094,996	351,816,398.
1905,	77,659,850	118,413,637	196,073 487	392,722 635
1906,	71,282,411	129,293,206	200,575,617	414,157,278
1907,	85,604,312	150,143,177	235,747,489	480,363,424
1908,	83,268.754	117,179,527	200,448,281	415,842,698
1909,	81,070,359	137,966,791	219,037,150	460,814,616
1910,	84,485,236	150,521,526	235,006 762	501,596,378
1911,	90,464,667	144,754,163	235,218,230	496,271,168
1912,	84,361,598	161,865 488	246,227,086	534,466,580
1913,	91,524,922	173,781,217	265,306,139	570,048,125

In the year 1882, when the first report of the mineral production of the country was issued by the United States Geological Survey, the total coal output of the United States was a little over 100,000,000 tons. The total output of the United States in 1913 was five and one-half times this amount, and that of Pennsylvania more than two and two third times the total of the United States in 1882. In 1890 the output of coal in Great Britain exceeded that of the United States by 30 per cent. Within a decade, however, the United States had overtaken Great Britain, and in 1913 the output of this country exceeded it by 77 per cent. The total coal production of Pennsylvania is but 19 per cent. less than the entire output of Great Britain, and exceeds that of the entire world, except Great Britain, Germany and the United States.

The combined production of anthracite and bituminous coal in Pennsylvania in 1913 exceeded that of 1912 by 29,000,000 short tons in quantity, and by more than $41,000,000 in value.

Attention has frequently been called to the very rapid increase in the production of coal, especially of anthracite coal, and the fact has been made prominent that the output of bituminous coal doubles each decade. The production of coal by no means bears any relation to the increase in population. In 1850 the production of coal per capita in the United States was about seven bushels. In 1860 this had increased to thirteen bushels per capita, in 1870 it was twenty-six bushels per capita, in 1880 it was forty bushels per capita, in 1890 it had risen to sixty-five bushels per capita, in 1900

it was ninety-one bushels per capita, and in 1907 it had reached one hundred and forty bushels per capita. In this time the population had increased 260 per cent., while the coal output had increased 7,375 per cent. The production in 1913 will show a very marked increase over the figures given.

Compared with other products we might say that from 1880 to 1900 the population in the United States increased 52 per cent., the lumber output increased 92 per cent., the pig iron production increased 190 per cent., while in the same 20 years the coal production increased 277 per cent.

ANTHRACITE COAL.

In the report on the mineral production of Pennsylvania for 1911 a condensed account of the early developments of the anthracite coal industry prepared by Mr. William Griffith, and published in the Coal Age of July 13, 1912, was given. For the history of the early developments of the anthracite industry reference is made to that report.

The production of anthracite in 1913 exceeded the previous high record by almost 1,000,000 tons, the total production being 81,718,680 long tons, valued at $195,181,127. The highest previous record of output was in 1911, 80,771,488 long tons, valued at $174,952,415.

The production of 1912 was materially reduced by the suspension of mining operations from the first of April to the latter part of May, pending the adjustment of the wage scale. During 1913 there were no serious interruptions with coal mining operations by labor trouble, and, as the wage scale of 1912 extends for four years, no serious interruptions of this nature are probable for sometime. It is probable that the unequaled output of 1913 was due to the reduced output of 1912, directly caused by these two months' suspension. Anthracite coal is almost entirely a domestic fuel, and it does not seem probable that there will be any marked increase in production in the future.

There was a marked decrease in the tonnage recovered from the old culm banks in 1913, the falling off of this part of the production being almost one-third. The first washery in the anthracite region was constructed in 1890, since which time there has been recovered from the culm banks 49,329,376 long tons of fuel. This quantity only represents the amount shipped. The maximum production was in 1907, when more than 4,300,000 tons were recovered for shipment. Since that time there has been a continuing decrease to less than one-half the production in 1913.

Of the total production of 87,718,680 long tons, 87.3 per cent., or 71,343,172 long tons were loaded for shipment. 10.5 per cent. were consumed in the generation of heat and power for the operation of the collieries, and 2.2 per cent. were sold to local trade or used by employes. The quantity of coal necessary to be used in the operation of the anthracite collieries is in marked contrast with the quantity consumed in the bituminous fields for the same purpose.

The average number of days worked in the anthracite field in 1913 was 257, being the highest of record, and exceeding the previous high mark of 1911 by 11 days.

The different portions of the anthracite field have long received distinct names, by which they are known both locally and in the several markets. The relation of the local districts and the trade regions are given in the following table.

ANTHRACITE COAL FIELDS, BY FIELD, LOCAL DISTRICT, AND TRADE REGION.

Coal Field or Basin.	Local District.	Trade Region.
Northern,	Carbondale, Scranton, Pittston, Wilkes-Barre, Plymouth, Kingston,	Wyoming.
Eastern Middle,	Green Mountain, Black Creek, Hazleton, Beaver Meadow, Panther Creek,	Lehigh.
Southern,	East Schuylkill, Western Schuylkill, Lorberry, Lykens Valley,	Schuylkill.
Western Middle,	East Mahanoy, West Mahanoy, Shamokin,	

The anthracite fields are reached by eleven so-called initial railroads as follows:

Philadelphia and Reading Railway.
Lehigh Valley Railroad.
Central Railroad of New Jersey.
Delaware, Lackawanna and Western Railroad.
Delaware and Hudson Company's Railroad.
Pennsylvania Railroad.
Erie Railroad.
New York, Ontario and Western Railway.
Delaware, Susquehanna and Schuylkill Railroad (part of Lehigh Valley system).

New York, Susquehanna and Western Railroad (part of Erie system).

The following table gives the yearly shipments of anthracite coal reported by the Bureau of Anthracite Coal statistics from 1820 to the close of 1913, distributed according to the three coal regions. This table does not include any coal sold locally or that used at or about the mines, nor does it include shipments from Sullivan county. It is probable that the shipments of coal prior to the year 1820 amounted in the aggregate from 10,000 to 12,000 long tons.

ANNUAL SHIPMENTS FROM THE SCHUYLKILL, LEHIGH, AND WYOMING REGIONS FROM 1820 TO 1913, IN LONG TONS.

Year.	Schuylkill Region.		Lehigh Region.		Wyoming Region.		Total.
	Quantity.	Per-centage.	Quantity.	Per-centage.	Quantity.	Per-centage.	Quantity.
1820, ...	.....	.....	365	.....	.....	.....	365
1821, ...	.....	.....	1,073	.....	.....	.....	1,073
1822, ...	1,480	39.79	2,240	60.21	.....	.....	3,720
1823, ...	1,128	16.23	5,823	83.77	.....	.....	6,951
1824, ...	1,567	14.10	9,541	85.90	.....	.....	11,108
1825, ...	6,500	18.66	28,393	81.40	.....	.....	34,893
1826, ...	16,767	34.90	31,280	65.10	.....	.....	48,047
1827, ...	31,360	49.44	32,074	50.56	.....	.....	63,434
1828, ...	47,284	61.00	30,232	39.00	.....	.....	77,516
1829, ...	79,973	71.35	25,110	22.40	7,000	6.25	112,083
1830, ...	89,984	51.50	41,750	23.90	43,000	24.60	174,734
1831, ...	81,854	46.29	40,966	23.17	54,000	30.54	176,820
1832, ...	209,271	57.61	70,000	19.27	84,000	23.12	363,271
1833, ...	252,971	51.87	123,001	25.22	111,777	22.91	487,749
1834, ...	226,692	60.19	106,244	28.21	43,700	11.60	376,636
1835, ...	339,508	60.54	131,250	23.41	90,000	16.05	560,758
1836, ...	432,045	63.16	148,211	21.66	103,861	15.18	684,117
1837, ...	530,152	60.93	223,902	25.75	115,387	13.27	869,441
1838, ...	446,875	60.49	213,615	28.92	78,207	10.59	738,697
1839, ...	475,077	58.06	221,025	27.01	122,300	14.94	818,402
1840, ...	490,596	56.73	225,313	26.07	148,470	17.18	864,379
1841, ...	624,466	65.07	143,037	14.90	192,270	20.03	959,773
1842, ...	583,273	52.62	272,540	24.59	252,599	22.79	1,108,412
1843, ...	710,200	56.21	267,793	21.19	285,605	22.60	1,263,598
1844, ...	887,937	54.45	377,002	23.12	365,911	22.43	1,630,850
1845, ...	1,131,724	56.23	429,453	21.33	451,836	22.45	2,013,013
1846, ...	1,308,500	55.81	517,116	22.07	518,389	22.11	2,344,005
1847, ...	1,665,735	57.79	633,507	21.98	583,067	20.23	2,882,309
1848, ...	1,733,721	56.12	670,321	21.70	685,196	22.18	3,089,238
1849, ...	1,728,500	53.30	781,556	24.10	732,910	22.60	3,242,966
1850, ...	1,840,620	54.80	690,456	20.56	827,823	24.64	3,358,899
1851, ...	2,328,525	52.34	964,224	21.68	1,156,167	25.98	4,448,916
1852, ...	2,636,835	52.81	1,072,136	21.47	1,284,500	25.72	4,993,471
1853, ...	2,665,110	51.30	1,054,309	20.49	1,475,732	28.41	5,195,151
1854, ...	3,191,670	53.14	1,207,186	20.13	1,603,478	26.73	6,002,334
1855, ...	3,552,943	73.77	1,284,113	19.43	1,771,511	26.80	6,608,567
1856, ...	3,603,029	52.91	1,351,970	19.52	1,972,581	28.47	6,927,580
1857, ...	3,373,797	50.77	1,318,541	19.84	1,952,603	29.39	6,644,941
1858, ...	3,273,245	47.86	1,380,030	20.18	2,186,094	31.96	6,839,369
1859, ...	3,448,708	44.16	1,628,311	20.86	2,731,236	34.98	7,808,255
1860, ...	3,749,632	44.04	1,821,674	21.40	2,941,817	34.56	8,513,123
1861, ...	3,160,747	39.74	1,738,377	21.85	3,055,140	38.41	7,954,264
1862, ...	3,372,583	42.86	1,351,054	17.17	3,145,770	39.97	7,869,407
1863, ...	3,911,683	40.90	1,894,713	19.80	3,759,610	39.30	9,566,006
1864, ...	4,161,970	40.89	2,054,669	20.19	3,960,836	38.92	10,177,475
1865, ...	4,356,959	45.14	2,040,913	21.14	3,254,519	33.72	9,652,391

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ANNUAL SHIPMENTS FROM THE SCHUYLKILL, LEHIGH, AND WYOMING REGIONS FROM 1820 TO 1913, IN LONG TONS—Continued.

Year.	Schuylkill Region.		Lehigh Region.		Wyoming Region.		Total.
	Quantity.	Per-centage.	Quantity.	Per-centage.	Quantity.	Per-centage.	Quantity.
1866, ...	5,787,902	45.56	2,179,364	17.15	4,736,616	37.29	12,703,882
1867, ...	5,161,671	39.74	2,502,054	19.27	5,325,000	40.99	12,988,725
1868, ...	5,330,737	38.52	2,502,582	18.13	5,968,146	43.25	13,801,465
1869, ...	5,715,138	41.65	1,949,673	14.06	6,141,369	44.28	13,866,180
1870, ...	4,968,157	30.70	2,239,374	20.02	7,974,660	49.28	16,182,191
1871, ...	6,552,772	41.74	2,235,707	14.24	6,911,242	44.02	15,699,721
1872, ...	6,694,890	34.03	3,873,339	19.70	9,101,549	46.27	19,699,778
1873, ...	7,212,601	33.97	3,705,596	17.46	10,309,755	48.57	21,227,952
1874, ...	6,866,877	34.09	3,773,836	18.73	9,504,408	47.18	20,145,121
1875, ...	6,281,712	31.87	2,834,605	14.38	10,596,155	53.75	19,712,472
1876, ...	6,221,934	33.63	3,854,919	20.84	8,424,158	45.53	18,501,011
1877, ...	8,195,642	39.35	4,332,760	20.80	8,300,377	39.85	20,828,179
1878, ...	6,282,226	35.68	3,237,449	18.40	8,085,587	45.92	17,605,262
1879, ...	8,960,829	34.28	4,595,567	17.58	12,586,293	48.14	26,142,689
1880, ...	7,554,742	32.23	4,463,221	19.05	11,419,279	48.72	23,437,242
1881, ...	9,253,958	32.46	5,294,676	18.58	13,951,383	48.96	28,500,017
1882, ...	9,459,288	32.48	5,689,437	19.54	13,971,371	47.98	29,120,096
1883, ...	10,674,726	31.69	6,113,809	19.23	15,604,492	49.08	31,793,027
1884, ...	9,478,314	30.85	5,562,226	18.11	15,677,753	51.04	30,718,293
1885, ...	9,488,426	30.01	5,898,634	18.65	16,236,470	51.34	31,623,530
1886, ...	9,381,407	29.19	5,723,129	17.89	17,031,826	52.82	32,136,362
1887, ...	10,609,028	30.63	4,347,061	12.55	19,684,929	56.82	34,641,018
1888, ...	10,654,116	27.93	5,639,236	14.78	21,852,366	57.29	38,145,718
1889, ...	10,486,185	29.28	6,294,073	17.57	19,036,835	53.15	35,817,093
1890, ...	10,867,822	29.68	6,329,658	17.28	19,417,979	53.04	36,615,459
1891, ...	12,741,258	31.50	6,381,838	15.78	21,325,240	52.72	40,448,336
1892, ...	12,626,784	30.14	6,451,076	15.40	22,815,480	54.46	41,893,340
1893, ...	12,357,444	28.68	6,892,352	15.99	23,839,741	55.33	43,089,537
1894, ...	12,035,005	29.08	6,705,434	16.20	22,650,761	54.72	41,391,200
1895, ...	14,269,932	30.68	7,298,124	15.69	24,943,421	56.63	46,511,477
1896, ...	13,097,571	30.34	6,490,441	15.03	23,589,473	54.63	43,177,485
1897, ...	12,181,661	29.26	6,249,540	15.00	23,207,263	55.74	41,637,864
1898, ...	12,678,875	28.83	6,253,109	14.92	23,567,767	56.25	41,899,751
1899, ...	14,199,009	29.79	6,887,909	14.45	26,578,286	55.76	47,665,204
1900, ...	13,502,732	29.94	6,918,627	15.33	24,686,125	54.73	45,107,484
1901, ...	16,019,591	29.92	7,211,974	13.45	30,337,036	56.63	53,568,601
1902, ...	8,471,391	27.15	3,470,736	11.12	19,258,763	61.73	31,200,890
1903, ...	16,474,790	27.75	7,164,783	12.07	35,723,253	60.18	59,362,831
1904, ...	16,379,293	28.49	7,107,220	12.36	34,006,009	59.15	57,492,522
1905, ...	17,703,099	28.83	7,849,205	12.78	35,857,897	58.39	61,410,201
1906, ...	16,011,285	28.75	7,046,617	12.65	32,640,693	58.60	55,698,595
1907, ...	20,141,288	30.01	8,320,653	12.41	38,638,452	57.58	67,109,393
1908, ...	18,093,461	27.85	7,786,255	12.04	38,872,295	60.11	64,665,011
1909, ...	16,864,147	27.21	7,532,271	12.16	37,573,467	60.63	61,969,885
1910, ...	17,845,620	27.49	8,627,539	13.29	38,433,227	59.22	64,905,786
1911, ...	19,375,369	27.70	9,775,018	13.97	40,803,912	58.33	69,954,299
1912, ...	18,013,406	28.32	8,571,861	13.47	37,025,311	58.21	63,610,578
1913, ...	19,338,870	28.00	9,347,583	13.53	40,388,175	58.47	69,069,628
Total, ..	614,097,380	31.46	301,172,559	15.43	1,036,760,952	53.11	1,952,030,891

The following table gives the production of anthracite coal in 1912 and 1913 by counties.

ANTHRACITE PRODUCTION IN 1912 AND 1913, BY COUNTIES, IN LONG TONS.

County.	Shipped.	Sold to Local Trade Employees.	Used at Mines for Steam and Heat.	Total.
1912.				
Carbon,	2,163,896	118,852	285,557	2,568,305
Columbia,	936,704	15,684	127,478	1,079,866
Dauphin,	625,570	21,594	196,677	843,841
Lackawanna,	16,901,030	644,797	1,737,987	19,283,814
Luzerne,	24,645,483	822,840	2,821,556	28,289,879
Northumberland,	5,238,591	116,320	665,529	6,020,440
Schuylkill,	13,676,628	299,802	2,062,077	16,038,507
Sullivan,	534,004	7,597	38,072	579,673
Susquehanna and Wayne,	479,347	9,594	43,867	532,808
River dredges,	28,002	56,824	896	85,722
Total,	65,229,255	2,113,904	7,979,696	75,322,855
1913.				
Carbon,	2,600,127	111,227	354,960	3,066,314
Columbia,	922,532	16,136	139,813	1,078,481
Dauphin,	712,349	20,048	214,273	946,670
Lackawanna,	18,022,318	450,949	1,767,223	20,240,490
Luzerne,	27,713,933	731,667	3,093,779	31,539,379
Northumberland,	5,447,529	116,290	697,683	6,261,502
Schuylkill,	14,859,215	252,526	2,216,925	17,328,666
Sullivan,	537,404	7,509	48,000	592,913
Susquehanna and Wayne,	480,309	7,865	42,105	530,279
River dredges,	47,456	79,597	6,933	133,986
Total,	71,343,173	1,793,814	8,581,694	81,718,680

The most interesting and value study of the production of anthracite coal is shown by the following table, in which are given the output of the several sizes of coal in each of the counties during the years 1909, 1910, 1911, 1912 and 1913.

QUANTITY AND PERCENTAGE OF EACH SIZE OF ANTHRACITE SHIPPED FROM EACH COUNTY IN 1909, 1910, AND 1911.

County.	Lump and Steamboat.		Broken.		Egg.		Stove.		Chestnut.		Pea.	
	Quantity.	Percentage.	Quantity.	Percentage	Quantity.	Percentage.	Quantity.	Percentage.	Quantity.	Percentage	Quantity.	Percentage.
1909.												
Carbon,	68,276	8.63	185,346	5.39	217,087	2.79	279,688	2.40	318,910	2.46	268,792	3.51
Columbia,	51,129	6.46	67,621	1.97	125,255	1.61	137,705	1.18	155,162	1.20	119,287	1.56
Dauphin,	.....	.....	26,549	.77	42,974	.55	88,934	.76	106,407	.82	70,775	.93
Lackawanna,	72,216	9.12	657,015	19.11	2,052,505	26.37	3,242,653	27.83	3,374,727	26.04	1,917,208	25.06
Luzerne,	197,443	24.94	1,348,921	39.23	3,228,754	41.49	4,826,735	41.43	5,707,896	44.04	2,735,081	35.74
Northumberland,	41,800	5.28	142,177	4.13	468,028	6.01	952,304	8.17	965,011	7.44	626,139	8.18
Schuylkill,	338,909	42.82	955,230	27.78	1,516,213	19.48	1,928,765	16.55	2,165,742	16.71	1,757,595	22.97
Sullivan,	.....	.....	10,341	.30	52,101	.67	67,386	.60	101,418	.78	67,095	.88
Susquehanna and Wayne,	21,750	2.75	45,349	1.32	80,040	1.03	125,722	1.08	66,614	51	89,696	1.17
Total,	791,523	100.00	3,438,558	100.00	7,782,957	100.00	11,651,892	100.00	12,961,887	100.00	7,651,668	100.00

County.	Buckwheat No. 1.		Buckwheat No. 2.		Buckwheat No. 3.		Screening		Total.	
	Quantity.	Percentage.	Quantity.	Percentage	Quantity.	Percentage.	Quantity.	Percentage.	Quantity.	Percentage.
Carbon,	281,893	3.08	222,679	3.96	118,691	3.58	.....	.....	1,961,362	3.13
Columbia,	123,177	1.35	60,859	1.08	2,490	.08	.....	.....	842,685	1.34
Dauphin,	160,773	1.76	126,642	2.25	11,327	.34	9,219	2.85	643,600	1.03
Lackawanna,	2,053,985	22.46	1,610,758	28.66	1,403,970	42.30	11,233	3.48	16,396,270	26.10
Luzerne,	3,362,755	36.78	1,730,902	30.80	1,260,937	37.99	36,969	11.45	24,436,413	38.98
Northumberland,	858,162	9.39	524,535	9.34	41,676	1.26	343	.11	4,620,175	7.37
Schuylkill,	2,207,650	25.13	1,305,796	23.24	479,658	14.45	39,762	12.32	12,785,329	20.40
Sullivan,	4,998	.05	37,712	.67	.....	.....	225,503	69.79	525,644	.84
Susquehanna and Wayne,	.....	.....	.....	.....	.....	.....	.....	.....	471,881	.75
Total,	9,143,393	100.00	5,619,883	100.00	3,318,769	100.00	322,829	100.00	62,683,359	100.00

QUANTITY AND PERCENTAGE OF EACH SIZE OF ANTHRACITE SHIPPED FROM EACH COUNTY IN 1909, 1910, AND 1911.—Continued.

County.	Lump and Steamboat.		Broken.		Egg.		Stove		Pea.		Chestnut.	
	Quantity.	Percentage.	Quantity.	Percentage	Quantity.	Percentage.	Quantity.	Percentage.	Quantity.	Percentage	Quantity.	Percentage.
1910.												
Carbon,	38,201	5.29	180,273	5.37	298,015	3.75	340,687	2.83	437,970	3.05	292,216	3.72
Columbia,	16,599	2.30	24,328	.73	104,979	1.32	103,777	.86	182,442	1.27	91,305	1.16
Dauphin,	.....	.....	27,463	.82	42,562	.54	95,362	.79	99,661	.69	62,602	.80
Lackawanna,	41,106	5.69	538,418	16.03	1,846,128	23.23	3,548,387	29.49	3,939,588	27.44	2,121,208	27.02
Luzerne,	221,338	30.62	1,520,253	45.26	3,410,093	42.91	4,671,497	38.83	5,960,699	41.53	2,689,939	34.27
Northumberland,	50,904	7.04	160,580	4.79	495,863	6.24	987,841	8.21	1,042,018	7.26	647,502	8.25
Schuylkill,	354,619	49.06	884,518	26.33	1,647,590	20.73	2,120,098	17.62	2,457,086	17.12	1,804,709	22.99
Sullivan,	.....	.....	14,518	.41	50,209	.63	64,053	.53	100,077	.70	67,193	.86
Susquehanna and Wayne,	.....	.....	8,724	.26	51,661	.65	100,211	.84	134,927	.94	73,358	.93
Total,	722,767	100.00	3,359,075	100.00	7,947,100	100.00	12,031,913	100.00	14,354,468	100.00	7,850,032	100.00

County.	Buckwheat No. 1.		Buckwheat No. 2 and Rice.		Buckwheat No. 3 and Barley.		Screening		Total.	
	Quantity.	Percentage.	Quantity.	Percentage	Quantity.	Percentage.	Quantity.	Percentage.	Quantity.	Percentage.
Carbon,	392,472	4.15	372,469	6.05	86,078	2.53	.....	.....	2,438,321	3.71
Columbia,	122,362	1.29	75,355	1.23	7,273	.21	.....	.....	728,370	1.11
Dauphin,	143,702	1.52	121,564	1.98	2,361	.07	7,671	1.78	602,948	.92
Lackawanna,	2,169,377	22.92	1,651,619	26.85	1,518,030	44.66	17,066	3.95	17,290,927	26.46
Luzerne,	3,170,730	33.50	1,816,623	29.53	1,314,123	38.66	111,066	25.73	24,886,361	37.87
Northumberland,	924,162	9.76	580,156	9.43	71,437	2.10	.....	.....	4,900,463	7.55
Schuylkill,	2,456,691	25.96	1,524,569	24.78	355,409	10.45	73,107	16.93	13,678,396	20.82
Sullivan,	85,032	.90	9,383	.15	.....	.....	222,839	51.61	518,889	.79
Susquehanna and Wayne,	.....	.....	.....	.....	44,790	1.32	.....	.....	508,086	.77
Total,	9,464,528	100.00	6,151,678	100.00	3,399,451	100.00	431,749	100.00	65,712,761	100.00

QUANTITY AND PERCENTAGE OF EACH SIZE OF ANTHRACITE SHIPPED FROM EACH COUNTY IN 1909, 1910, AND 1911.—Continued.

County.	Lump and Steamboat.		Broken.		Egg.		Stove.		Chestnut.		Pea.	
	Quantity.	Percentage.	Quantity.	Percentage	Quantity.	Percentage.	Quantity.	Percentage.	Quantity.	Percentage	Quantity.	Percentage.
1911.												
Carbon,	20,158	3.80	173,761	4.79	283,119	3.35	368,218	2.82	549,793	3.43	338,719	4.09
Columbia,	16,395	3.09	6,488	.18	105,783	1.25	141,185	1.08	209,097	1.30	121,523	1.47
Dauphin,	.....	.....	24,502	.68	47,729	.56	108,862	.83	93,816	.59	55,040	.66
Lackawanna,	21,266	4.00	569,848	15.71	2,132,722	25.22	3,700,818	28.34	4,345,345	27.11	2,225,293	26.88
Luzerne,	189,113	35.61	1,679,338	46.30	3,628,839	42.91	5,254,302	40.25	6,612,686	41.25	2,770,109	33.46
Northumberland,	18,932	3.57	199,949	5.51	496,441	5.87	1,054,065	8.07	1,208,915	7.54	687,719	8.30
Schuylkill,	265,105	49.93	922,331	25.43	1,651,102	19.53	2,255,032	17.27	2,775,099	17.31	1,926,524	23.27
Sullivan,	.....	.....	12,919	.36	54,907	.65	74,780	.57	109,371	.68	75,195	.91
Susquehanna and Wayne,	.....	.....	37,503	1.04	55,639	.66	99,865	.77	127,346	.79	79,442	.96
Total,	530,999	100.00	3,626,699	100.00	8,456,281	100.00	13,057,127	100.00	16,031,468	100.00	8,279,561	100.00

County.	Buckwheat No. 1.		Buckwheat No. 2.		Buckwheat No. 3.		Screenings.		Total.	
	Quantity.	Percentage.	Quantity.	Percentage	Quantity.	Percentage.	Quantity.	Percentage.	Quantity.	Percentage.
Carbon,	372,147	3.78	278,778	4.47	126,828	3.23	1,154	0.28	2,512,675	3.57
Columbia,	172,929	1.76	132,193	2.12	13,244	.34	.....	.....	918,828	1.30
Dauphin,	139,550	1.42	141,599	2.27	38,913	.99	1,563	.38	651,664	.93
Lackawanna,	2 3 1,171	24.12	1,799,528	28.84	1,729,354	44.07	15,914	3.89	18,911,259	26.87
Luzerne,	3,113,707	31.67	1,688,735	27.07	1,331,623	33.93	88,443	21.61	26,356,895	37.44
Northumberland,	1,025,962	10.43	641,347	10.28	128,101	3.26	5,902	1.44	5,467,363	7.77
Schuylkill,	2,556,601	26.00	1,536,952	24.63	505,663	12.89	33,076	8.08	14,427,485	20.50
Sullivan,	.....	.....	.....	.....	.....	.....	263,224	64.32	590,306	.84
Susquehanna and Wayne,	80,431	.82	20,002	.32	50,741	1.29	.....	.....	550,969	.78
Total,	9,832,519	100.00	6,239,134	100.00	3,924,467	100.00	409,276	100.00	70,387,534	100.00

QUANTITY OF EACH SIZE OF ANTHRACITE SHIPPED FROM EACH COUNTY IN 1912 AND 1913, IN LONG TONS, AND PERCENTAGE OF TOTAL.

County.	Lump and Steamboat.	Broken.	Egg.	Stove.	Chestnut.	Pea.	Buckwheat No. 1.	Buckwheat No. 2 and Rice.	Buckwheat No. 3 and Barley.	Screening.	Total.
1912.											
Carbon,	12,465	164,130	253,626	300,390	425,749	293,306	309,002	292,000	101,447	11,601	2,163,896
Columbia,	20,593	11,547	145,855	149,906	210,383	108,780	151,662	121,616	16,362	.....	936,701
Dauphin,	.....	26,688	38,272	132,250	97,202	54,730	121,830	132,583	32,820	995	637,370
Lackawanna,	17,229	578,994	2,230,739	3,212,447	3,785,627	1,842,760	2,012,050	929,564	a2,247,148	44,472	16,901,030
Luzerne,	152,717	1,790,303	3,752,474	4,778,433	6,0.6,189	2,463,387	2,722,603	1,208,348	b1,735,888	18,114	24,618,456
Northumberland,	11,200	228,907	639,230	962,872	1,154,954	624,010	947,288	550,698	101,954	17,478	5,238,591
Schuylkill,	201,397	924,307	1,764,971	2,140,653	2,696,948	1,695,045	2,369,046	1,430,942	416,669	46,879	13,689,857
Sullivan,	.....	11,298	51,946	72,796	103,581	68,060	.....	.....	.....	226,333	534,004
Susquehanna and Wayne,	.....	18,393	57,951	79,653	100,449	56,171	64,602	25,818	76,310	.....	479,347
Total,	418,601	3,754,567	8,935,064	11,829,400	14,601,082	7,206,239	8,698,173	4,691,659	4,728,598	365,872	65,229,255
Percentage of total,	.64	5.76	13.70	18.14	22.38	11.05	13.33	7.19	7.25	.56	100.00
1913.											
Carbon,	15,358	134,842	298,758	390,827	551,536	372,972	359,128	299,760	176,946	.....	2,600,127
Columbia,	18,157	51,391	107,372	177,850	196,741	134,600	141,587	86,146	8,688	.....	922,532
Dauphin,	.....	24,582	43,435	135,587	112,358	64,665	132,562	113,989	84,463	708	712,349
Lackawanna,	12,563	501,002	2,301,923	3,790,759	4,386,779	2,096,974	2,225,647	1,439,209	1,247,806	13,646	18,022,318
Luzerne,	109,915	1,745,626	3,680,454	5,784,859	7,181,114	2,912,235	3,100,103	1,733,141	1,435,449	30,737	27,713,933
Northumberland,	30,798	170,618	567,634	1,039,617	1,326,782	622,441	976,798	582,045	117,677	13,089	5,447,529
Schuylkill,	175,923	858,688	1,881,280	2,426,315	3,192,963	1,880,397	2,495,723	1,365,335	540,479	42,112	14,859,215
Sullivan,	.....	13,716	49,315	80,009	103,185	66,110	.....	.....	.....	225,069	537,404
Susquehanna and Wayne,	.....	.....	44,926	95,963	117,359	58,287	72,613	14,112	77,019	.....	480,309
Total,	362,714	3,503,495	8,978,107	13,921,786	17,168,817	8,208,681	9,504,161	5,631,037	3,688,557	325,361	71,295,716
Percentage of total,	.51	4.92	12.59	19.53	24.08	11.51	13.33	7.90	5.17	.46	100.00

aIncludes 423,673 tons of "birdseye," a mixture of buckwheat Nos. 2 and 3.
bIncludes 251,597 tons of birdseye.

The entire output of anthracite coal for the years 1904 to 1913 is shown by the following table. This includes not only the coal shipped, but that sold locally, and the portion used in and about the washeries, and the amount recovered by dredges.

ANTHRACITE PRODUCTION IN PENNSYLVANIA, 1904 TO 1913.

County.	Shipped.	Sold to local trade and employes.	Used at mines for steam and heat.	Total.
1904.				
Susquehanna,	577,079	8,440	32,731	618,250
Lackawanna,	15,703,059	424,359	1,082,335	17,209,723
Luzerne,	21,678,253	589,932	2,190,514	24,478,779
Carbon,	1,744,543	30,338	228,808	2,003,689
Schuylkill,	12,149,852	212,461	1,810,980	14,173,293
Columbia,	926,571	16,069	85,595	1,028,235
Sullivan,	234,656	4,876	23,241	262,773
Northumberland,	4,249,306	101,406	567,130	4,917,842
Dauphin,	463,859	22,822	159,225	645,906
Total,	57,727,178	1,410,703	6,180,609	65,318,490
1905.				
Susquehanna,	563,882	8,803	34,588	607,273
Lackawanna,	16,044,175	384,668	1,097,152	17,525,995
Luzerne,	23,465,910	584,890	2,225,718	26,216,518
Carbon,	1,910,330	44,117	238,722	2,193,229
Schuylkill,	13,734,616	230,383	1,814,416	15,779,415
Columbia,	986,592	16,915	94,437	1,097,944
Sullivan,	244,231	4,286	25,650	274,167
Northumberland,	4,221,377	108,022	590,699	4,920,098
Dauphin,	543,259	20,560	160,694	724,513
Total,	61,654,432	1,402,644	6,282,076	69,339,152
1906.				
Susquehanna,	456,967	8,542	36,369	501,878
Lackawanna,	15,015,345	370,577	1,141,797	16,527,719
Luzerne,	20,636,738	550,661	2,250,890	23,447,289
Carbon,	1,744,229	64,164	214,130	2,022,523
Schuylkill,	12,512,308	229,125	1,722,600	14,464,023
Columbia,	736,816	14,548	107,939	859,303
Sullivan,	287,830	4,548	27,825	320,203
Northumberland,	4,143,877	106,361	595,818	4,846,056
Dauphin,	452,315	20,568	183,123	656,006
Total,	55,986,425	1,369,094	6,289,491	63,645,010
1907.				
Susquehanna,	520,955	9,623	44,503	575,081
Lackawanna,	17,955,465	382,730	1,570,532	19,908,727
Luzerne,	24,081,491	666,902	2,581,483	27,329,876
Carbon,	2,150,801	50,035	257,381	2,458,217
Schuylkill,	15,625,710	256,264	2,081,171	17,963,145
Columbia,	931,767	14,136	115,051	1,060,954
Sullivan,	349,391	5,152	32,155	386,698
Northumberland,	5,302,642	109,534	596,493	6,008,669
Dauphin,	540,562	22,455	178,037	741,054
Total,	67,458,784	1,516,831	7,456,806	76,432,421
1908.				
Carbon,	2,056,630	60,640	259,180	2,376,450
Columbia,	911,681	16,428	127,539	1,055,648
Dauphin,	553,840	23,366	188,712	765,918
Lackawanna,	17,654,782	336,684	1,615,802	19,657,268
Luzerne,	24,553,934	669,688	2,753,107	27,976,729
Northumberland,	4,609,627	105,067	592,057	5,306,751
Schuylkill,	13,935,526	258,286	2,088,154	16,281,966
Sullivan,	453,961	6,039	31,710	491,710
Susquehanna,	388,994	10,375	35,293	434,662
Total,	65,118,975	1,536,573	7,691,554	74,347,102

ANTHRACITE PRODUCTION IN PENNSYLVANIA 1904 TO 1913.—Continued.

County.	Shipped.	Sold to local trade and employes.	Used at mines for steam and heat.	Total.
1909.				
Carbon,	1,961,362	77,665	260,872	2,299,899
Columbia,	842,685	16,713	118,503	977,901
Dauphin,	643,600	23,871	165,022	832,493
Lackawanna,	16,396,270	593,772	1,533,918	18,523,960
Luzerne,	24,426,413	781,827	2,864,321	28,072,561
Northumberland,	4,620,175	106,728	622,632	5,349,535
Schuylkill,	12,785,329	200,617	2,079,031	15,118,977
Sullivan,	525,644	6,234	39,086	570,904
Susquehanna and Wayne,	471,881	8,399	41,440	521,720
River dredges,	9,136	85,243	1,860	96,239
Total,	62,692,495	1,961,069	7,720,685	72,374,249
1910.				
Carbon,	2,438,321	64,800	299,734	2,802,855
Columbia,	728,370	12,837	104,141	845,348
Dauphin,	602,948	55,931	132,364	791,243
Lackawanna,	17,390,927	453,670	1,721,768	19,566,365
Luzerne,	24,886,361	732,449	2,928,993	28,547,803
Northumberland,	4,900,463	119,408	633,398	5,713,269
Schuylkill,	13,678,396	279,137	1,986,641	15,944,174
Sullivan,	518,889	6,898	39,175	564,962
Susquehanna,	508,086	9,935	47,373	565,394
River dredges,	22,263	69,017	553	91,833
Total,	65,735,024	1,804,082	7,894,140	75,433,246
1911.				
Carbon,	2,512,675	87,986	346,113	2,946,774
Columbia,	918,828	11,165	135,843	1,065,836
Dauphin,	651,664	51,525	142,316	845,505
Lackawanna,	18,911,259	618,619	1,699,265	21,229,143
Luzerne,	26,356,895	771,536	3,074,968	30,203,399
Northumberland,	5,467,363	110,699	649,657	6,227,719
Schuylkill,	14,427,485	304,026	2,138,081	16,869,592
Sullivan,	590,396	7,203	42,963	640,562
Susquehauna,	550,960	9,809	48,058	608,836
River dredges,	17,400	76,643	604	94,647
Total,	70,404,934	2,049,211	8,277,868	80,732,013
1912.				
Carbon,	2,163,896	118,852	285,557	2,568,305
Columbia,	936,704	15,684	127,478	1,079,866
Dauphin,	625,570	21,594	196,677	843,841
Lackawanna,	16,901,030	644,797	1,737,987	19,283,814
Luzerne,	24,645,483	822,840	2,821,556	28,289,879
Northumberland,	5,238,591	116,320	665,529	6,020,440
Schuylkill,	13,676,628	299,802	2,062,077	16,038,507
Sullivan,	534,004	7,597	38,072	579,673
Susquehanna and Wayne,	479,347	9,594	43,867	532,808
River dredges,	28,002	56,824	896	85,722
Total,	65,229,255	2,113,904	7,979,696	75,322,855
1913.				
Carbon,	2,600,127	111,227	354,960	3,066,314
Columbia,	922,532	16,136	139,813	1,078,481
Dauphin,	712,349	20,048	214,273	946,670
Lackawanna,	18,022,318	450,949	1,767,223	20,240,490
Luzerne,	27,713,933	731,667	3,093,779	31,539,379
Northumberland,	5,447,529	116,290	697,683	6,261,502
Schuylkill,	14,859,215	252,526	2,216,925	17,328,666
Sullivan,	537,404	7,509	48,000	592,913
Susquehanna and Wayne,	480,309	7,865	42,105	530,279
River dredges,	47,456	79,597	6,933	133,986
Total,	71,343,172	1,793,814	8,581,694	81,718,680

BITUMINOUS COAL.

The bituminous output of Pennsylvania in 1913 broke all previous records, exceeding the previous maximum production by 11,915,729 short tons and by $23,669,309 in value.

This increase in production was pretty generally distributed over the bituminous coal fields, only three counties, out of the twenty-six producing, showing decreases. The two counties, Fayette and Westmoreland, constituting the Connellsville and Lower Connellsville coking district, had a combined production of 65,850,000 short tons, being but 5,500,000 tons less than the total output of West Virginia, the second coal producing state, and exceeding the output of Illinois, the third coal producing state, by 4,000,000 tons. The production of these two counties was greater than that of any country on the face of the earth except the United States, Great Britain and Germany—exceeding the output of Austria-Hungary by 15 per cent.

Cambria county increased its output in 1913 by over 2,000,000 tons, and Allegheny, Armstrong, Indiana and Washington each increased their output by more than 1,000,000 tons.

The most favorable thing connected with the bituminous coal output, however, was the slight increase in prices, which advanced from $1.05 in 1912 to $1.11 in 1913. This is the highest price obtained for bituminous coal in Pennsylvania for thirty years, except for the year 1903 when the price was abnormally high on account of the strike conditions, and it was within $0.07 of the average price for that year.

In 1913 the reports show that the quantity of coal shot off the solid was less than 3 per cent. of the total output. The quantity mined by machines was 92,487,438 short tons, or 53.2 per cent. of the total, as against 50.8 per cent. machine mined in 1912. There was an increase of 125 in the total number of machines used, and a decrease of over 300 in the number of "puncher" machines. The number of long wall machines increased from 52 to 137.

The average number of days worked was 267 and the average production per man was 1,009 short tons, the average daily production being 3.78 tons. The average daily output of all the mines was almost 650,000 tons.

The following table gives the production of coal by counties with the distribution of the product for 1912 and 1913.

BITUMINOUS COAL PRODUCTION OF PENNSYLVANIA IN 1912 AND 1913, BY COUNTIES, IN SHORT TONS.

County.	Loaded at mines for shipment.	Sold to local trade and used by employes.	Used at mines for steam and heat.	Made into coke.	Total quantity.	Total value.	Average price per ton.	Average number of days active.	Average number of employes.
1912.									
Allegheny,	18,087,903	474,116	305,096	150	18,867,265	$20,528,181	$1.09	249	20,756
Armstrong,	3,849,829	126,031	127,329	1,800	4,104,989	4,054,301	.99	216	5,589
Beaver,	160,937	82,912	3,616	.....	247,465	309,304	1.25	261	392
Bedford,	503,985	9,511	16,750	201,231	731,477	795,031	1.09	233	1,067
Blair,	274,795	366	8,666	40,509	324,336	378,511	1.17	209	467
Butler,	969,075	11,284	20,588	.....	1,000,947	1,131,503	1.13	266	1,285
Cambria,	14,563,434	1,314,170	407,268	1,300,258	17,585,130	19,200,298	1.09	241	21,356
Centre,	1,275,221	13,412	2,741	.....	1,291,374	1,292,301	1.00	236	1,788
Clarion,	1,158,837	13,249	27,236	.....	1,199,322	1,223,537	1.02	229	1,629
Clearfield,	7,149,021	220,326	234,867	334,123	7,938,337	8,220,763	1.04	233	10,372
Clinton,	332,974	11,005	1,475	.....	345,454	427,192	1.24	248	393
Elk,	1,099,827	11,915	25,344	9,410	1,146,496	1,132,363	.99	245	1,727
Fayette,	7,233,926	317,476	588,535	24,226,636	32,366,567	32,595,749	1.01	275	22,776
Huntingdon,	811,586	6,087	16,126	1,115	834,914	1,025,646	1.23	254	1,112
Indiana,	8,394,140	38,560	317,843	424,384	9,174,927	8,872,019	.97	259	10,992
Jefferson,	4,367,620	59,750	109,723	879,443	5,416,536	5,168,998	.95	244	5,940
Lawrence,	59,906	3,578	12,339	.....	75,823	94,124	1.24	256	127
Mercer,	751,772	51,111	43,345	.....	846,228	1,052,367	1.24	249	1,284
Somerset,	9,549,469	112,170	226,505	.....	9,888,144	11,034,445	1.12	257	9,586
Tioga,	956,170	29,967	11,650	.....	997,787	1,569,289	1.57	218	1,865
Washington,	14,972,227	122,573	367,339	1,182,988	16,645,127	18,012,167	1.08	236	18,714
Westmoreland,	19,899,766	659,743	770,489	9,259,551	30,589,549	30,971,778	1.01	272	25,693
Other counties and small mines,*	55,294	161,583	12,497	17,920	247,294	270,630	1.09	220	234
Total,	116,477,708	3,850,895	3,657,367	37,879,518	161,865,488	$169,370,497	$1.05	252	165,144

*Cameron, Fulton, Greene, Lycoming and McKean.

BITUMINOUS COAL PRODUCTION OF PENNSYLVANIA IN 1912 AND 1913, BY COUNTIES, IN SHORT TONES.—Continued.

County.	Loaded at mines for shipment.	Sold to local trade and used by employes.	Used at mines for steam and heat.	Made into coke.	Total quantity.	Total value.	Average price per ton.	Average number of days active.	Average number of employes.
1913.									
Allegheny,	19,014,187	786,049	315,166	2,421	20,117,823	$23,158,897	$1.15	252	21,650
Armstrong,	5,068,536	102,739	150,347	.....	5,321,622	5,476,228	1.03	260	6,134
Beaver,	170,782	74,149	3,654	.....	248,585	337,372	1.36	282	355
Bedford,	589,949	139,988	15,146	105,709	850,792	927,379	1.09	244	1,154
Blair,	323,030	317	9,354	59,016	391,717	463,225	1.18	217	553
Butler,	1,633,292	17,578	29,132	.....	1,080,002	1,210,524	1.12	263	1,368
Cambria,	16,761,239	1,177,991	387,358	1,294,790	19,621,378	21,903,291	1.12	272	21,976
Centre,	1,475,751	17,271	4,249	.....	1,497,271	1,499,395	1.00	260	1,833
Clarion,	1,390,163	4,395	33,290	.....	1,427,848	1,517,316	1.06	252	1,877
Clearfield,	7,435,828	234,358	228,701	379,128	8,278,015	8,579,446	1.04	258	10,121
Clinton,	330,028	11,578	1,448	.....	343,054	441,249	1.29	281	290
Elk,	1,140,364	30,455	30,246	.....	1,201,065	1,251,090	1.04	270	1,721
Fayette,	7,727,676	339,125	661,835	23,879,327	32,607,963	37,810,508	1.16	284	23,704
Greene,	248,152	6,227	18,423	43,950	316,752	321,001	1.01	207	428
Huntingdon,	882,040	5,936	16,761	31,037	935,774	1,060,367	1.13	268	1,262
Indiana,	9,638,385	59,051	251,872	255,376	10,204,684	10,297,482	1.01	277	12,026
Jefferson,	4,563,844	70,956	120,981	1,046,083	5,801,864	5,794,490	.99	271	5,790
Lawrence,	78 478	2,701	13,104	.....	94,283	118,835	1.26	259	220
Mercer,	687,869	41,875	47,857	.....	777,601	960,624	1.24	260	1,231
Somerset,	9,601,406	77,348	250,022	.....	9,928,776	11,119,355	1.12	270	9,666
Tioga,	903,161	31,240	9,347	.....	943,748	1,544,537	1.64	224	1,757
Washington,	16,607,903	134,102	424,734	1,142,578	18,309,317	20,497,946	1.12	249	20,012
Westmoreland,	22,240,531	598,925	780,723	9,638,523	33,258,702	36,490,802	1.10	281	26,847
Other counties and small mines,*	45,810	158,076	2,779	15,916	222,581	258,447	1.16	201	221
Total,	127,958,404	4,122,430	3,806,529	37,893,854	173,781,217	193,039,806	$1.11	267	172,196

*Cameron, Lycoming and McKean.

The total production in each of the several counties for the last five years is given in the following table.

BITUMINOUS COAL PRODUCTION OF PENNSYLVANIA, 1909-1913, BY COUNTIES. IN SHORT TONS.

County.	1909.	1910.	1911.	1912.	1913.	Increase (+) Decrease (--) 1913.
Allegheny, ...	16,087,010	18,835,336	17,863,795	18,867,265	20,117,823	+ 1,250,558
Armstrong, ...	2,787,508	3,304,915	3,799,227	4,104,989	5,321,622	+ 1,216,633
Beaver, ...	224,450	228,226	203,556	247,465	248,585	+ 1,120
Bedford, ...	435,129	716,833	528,170	731,477	850,792	+ 119,315
Blair, ...	410,161	380,870	294,048	324,336	391,717	+ 67,381
Butler, ...	828,043	1,017,809	957,074	1,000,947	1,080,002	+ 79,055
Cambria, ...	15,545,185	16,629,461	16,928,628	17,585,130	19,621,378	+ 2,036,248
Centre, ...	1,239,049	1,293,622	1,140,263	1,291,374	1,497,271	+ 205,897
Clarion, ...	941,059	1,156,697	1,057,390	1,199,322	1,427,848	+ 228,526
Clearfield, ...	7,573,322	8,463,910	7,852,426	7,938,337	8,278,015	+ 339,678
Clinton, ...	272,184	310,973	314,643	345,454	343,054	— 2,400
Elk, ...	1,150,675	1,202,323	1,223,856	1,146,496	1,201,065	+ 54,569
Fayette, ...	28,866,229	31,097,233	26,610,162	32,366,567	32,607,963	+ 241,396
Greene, ...	137,448	77,321	31,743	35,839	316,752	+ 280,913
Huntingdon, ...	502,823	669,226	806,199	834,914	935,774	+ 100,860
Indiana, ...	7,681,205	8,954,366	8,780,983	9,174,927	10,204,684	+ 1,029,757
Jefferson, ...	4,934,907	5,668,883	5,550,816	5,416,536	5,801,864	+ 385,328
Lawrence, ...	156,749	95,102	90,151	75,823	94,283	+ 18,460
Lycoming, ...	28,016	25,725	13,271	7,777	26,953	+ 19,176
Mercer, ...	893,880	867,754	859,355	846,228	777,601	— 68,627
Somerset, ...	7,992,338	8,837,682	9,177,421	9,888,144	9,928,776	+ 40,632
Tioga, ...	785,922	1,037,417	830,330	997,787	943,748	— 54,039
Washington, ...	12,982,179	16,638,677	15,343,772	16,645,127	18,309,317	+ 1,664,190
Westmoreland, .	25,432,320	22,885,404	24,102,195	30,589,549	33,258,702	+ 2,669,153
Small mines, ..	a169,000	a125,761	b201,783	c203,678	d195,628	— 8,050
Total, ...	137,966,791	150,521,526	144,561,257	161,865,488	173,781,217	+ 11,915,729
Total value, ...	$130,085,237	$153,029,510	$146,154,952	$169,370,497	$193,039,806	+$23,669,309

aIncludes production of Bradford and Cameron counties.
bIncludes production of Bradford, Cameron and McKean counties.
cIncludes Cameron, Fulton and McKean counties.
dIncludes Cameron and McKean counties.

The history of the early production of bituminous coal is not as well known as that of the anthracite. The tables of production generally begin with the year 1840, and in the following table is given the estimated output for each of the years from 1840 to 1870. The production from the year 1870 to date are official.

PRODUCTION OF BITUMINOUS COAL IN PENNSYLVANIA FROM 1840 TO 1913, IN SHORT TONS.

Year.	Quantity.	Year.	Quantity.	Year.	Quantity.	Year.	Quantity.
1840, ...	464,826	1859, ...	2,400,000	1878, ...	15,120,000	1897, ...	54,417,974
1841, ...	475,000	1860, ...	2,690,786	1879, ...	16,240,000	1898, ...	65,165,133
1842, ...	500,000	1861, ...	3,200,000	1880, ...	18,425,163	1899, ...	74,150,175
1843, ...	650,000	1862, ...	4,000,000	1881, ...	22,400,000	1900, ...	79,842,326
1844, ...	675,000	1863, ...	5,000,000	1882, ...	24,640,000	1901, ...	82,305,946
1845, ...	700,000	1864, ...	5,833,000	1883, ...	26,880,000	1902, ...	98,574,367
1846, ...	760,000	1865, ...	6,350,000	1884, ...	28,000,000	1903, ...	103,117,178
1847, ...	399,840	1866, ...	6,800,000	1885, ...	26,000,000	1904, ...	97,938,287
1848, ...	500,000	1867, ...	7,300,000	1886, ...	27,094,501	1905, ...	118,413,637
1849, ...	750,000	1868, ...	7,500,000	1887, ...	31,516,856	1906, ...	129,293,206
1850, ...	1,000,000	1869, ...	6,750,000	1888, ...	33,796,727	1907, ...	150,143,177
1851, ...	1,200,000	1870, ...	7,798,518	1889, ...	36,174,089	1908, ...	117,179,527
1852, ...	1,400 000	1871, ...	9,040,565	1890, ...	42,302,173	1909, ...	137,966,791
1853, ...	1,500 000	1872, ...	11,695,040	1891, ...	42,788,490	1910, ...	150,521,526
1854, ...	1,650,000	1873, ...	13,098,829	1892, ...	46,694,576	1911, ...	144,561,257
1855, ...	1,780,000	1874, ...	12,320,000	1893, ...	44,070,724	1912, ...	161,865,488
1856, ...	1,850 000	1875, ...	11,760,000	1894, ...	39,912,463	1913, ...	173,781,217
1857, ...	2,000,000	1876, ...	12,880,000	1895, ...	50,217,228		
1858, ...	2,200 000	1877, ...	14,000,000	1896, ...	49,557,453	Total, ...	2,731,945,059

The bituminous coal field of Pennsylvania underlies a great portion of the western half of the State. The estimated total area is 14,200 square miles. The larger developments, beginning at the northeast, can be designated as the (1) Cambria-Clearfield district, including areas in Cambria, Clearfield, Indiana and Jefferson counties. Here the production is mainly from the Lower Freeport bed, belonging to the Lower Productive or Allegheny Series. This bed is well developed in this region, although elsewhere it is generally worthless. (2) The Pittsburgh District embraces Allegheny and Washington counties, in which the Pittsburgh bed of coal furnishes most of the output. The Pittsburgh bed lies at the base of the Upper Productive or Monongahela Series, and is the most uniform and valuable coal bed known. (3) The third large mining district embraces Fayette and Westmoreland counties, where the Pittsburgh bed is the main producer also.

The principal coals mined in Pennsylvania are found in the Allegheny and Monongahela Series of the Carboniferous. There are seven well known beds of coal in the Allegheny Series, named in ascending order, the Brookville, Clarion, Lower Kittanning, Middle Kittanning, Upper Kittanning, Lower Freeport and Upper Freeport. The Lower Kittanning and the two Freeport coals are the most valuable and the principal producers in the Allegheny Series. About 40 per cent. of the coal production of Pennsylvania comes from the Allegheny Series. The Monongahela Series is separated from the Allegheny by several hundred feet of strata known as the Conemaugh Series, in which there is but little coal, practically none of commercial value. In the Monongahela Series the Pittsburgh coal forms the base, and in addition to the Pittsburgh there are the Redstone, Sewickley, Uniontown and Waynesburg coals, which are of value locally. The Pittsburgh bed of coal produces practically 60 per cent. of the output of Pennsylvania.

In the late 80's Prof. J. P. Lesley, then State Geologist of Pennsylvania, in an address at Pittsburgh, made an estimate of the duration of the Pittsburgh coal. Prof. Lesley estimated the area of the Pittsburgh bed in Pennsylvania at 2,500 square miles. Of this area he cut off one-half for intervals between crops, places where the coal was absent, etc., leaving 1,250 square miles of available coal. He estimated the coal at 1,000,000 tons per foot mile, and allowing an average thickness of 8 feet we would have a total tonnage originally in the ground of 10,000,000,000 tons. Under the conditions of mining, as then practiced, Prof. Lesley cut off one-half of this amount for loss in mining, leaving 5,000,000,000 tons as the available supply of coal. Based on the then output of Pittsburgh coal the duration of the bed would have been 455 years (the figures as published make Prof. Lesley as saying the duration would have been 5,000 years.

In some way an extra figure was added in the published statements.) Based on the then rate of production and increase Prof. Lesley stated that the coal would not last over 80 years. The actual time under the figures assumed by Prof. Lesley was 57 years. It should be noted in passing that the rate of mining has increased more rapidly than assumed by Prof. Lesley, but on the other hand, the proportion of coal recovered has increased materially.

The note of warning sounded by Prof. Lesley has not been heeded. Based on the actual figures he assumed the Pittsburgh coal will be exhausted in 1944. Much more accurate figures are now available of the unmined areas of coal, and the expected recovery is more than estimated by Prof. Lesley, while the amount of coal mined is greater than the evidence available at that time suggested. Recent estimates of the duration of the Pittsburgh bed, however, do not vary widely from this estimate of Prof. Lesley, made almost thirty years ago.

In a recent paper before the American Institute of Mining Engineers, Mr. A. J. Kuhn has given the probable life of the various portions of the Pittsburgh coal field in Pennsylvania. Based upon a study of the areas remaining unmined, the probable demand for fuels of Pittsburgh grade within reach of the Pittsburgh region, the cost of mining, etc., showing that the life of the various portions of the field will differ greatly. He finds that the duration of the Connellsville basin will be 15 years, of the Klondike or Lower Connellsville basin 20 years, of the gas coal field 15 years, of the Panhandle coal 40 to 50 years, of the coal of the eastern portion of Greene county, which is supposed to be of coking quality, 40 years, and of the remaining portion of Greene county 55 years. When these various figures are combined they give an average life of the field of less than 40 years, and it is remarkable how closely these figures agree with the earlier generalized statement of Prof. Lesley.

COKE.

The production of coke in the United States in 1913 exceeded all previous records, amounting to 46,299,530 short tons, with a value of $128,922,273. This is not only a new record as regards the quantity and gross value of the output, but also as regards the average value per ton of product, the average being $2.78 per ton, exceeding the previous high mark of 1907. While on the face of the returns this showed a marked increase of $17,117,160 in value, yet the value of the coal made into coke in 1913 exceeded the year 1912 by $13,642,487, leaving an apparent increase in value of but $3,474,673. As the increase in

the quantity of coke produced was 2,315,931 short tons, it would appear that the actual returns to the producers were relatively less than in 1912. The value of the coal per ton of coke produced in 1912 was $1.98 and in 1913 was $2.17. The average value per ton for oven coke in 1913 was $2.39 as compared with $2.12 in 1912.

What was true as regards the general coke industry of the United States is true as regards the coke industry of Pennsylvania. The total coal consumed in the manufacture of coke in 1913 was 69,239,190 short tons, with a value of $100,561,439 as compared with 65,577,862 short tons in 1912, with a total value of $86,918,952. The value of the coke made in 1913 was $128,922,273, which gives an apparent profit of $28,360,834, less the cost of manufacture and general expense. In 1912 the value of the coke produced was $111,805,113, exceeding the value of the coal coked by $24,886,160. The excess in the value of the coke over the coal used in 1913 as compared with 1912 was $3,474,673, which may be said to represent the value of the coke produced in 1913 over 1912, which was 2,315,931 short tons, or an apparent value of about $1.50 per ton as compared with the average value of all coke produced of $2.78 per ton.

The following table gives the production of coke for 1912 and 1913 in each of the several states.

MANUFACTURE OF COKE, BY STATES, 1912 AND 1913.

State.	Establishments.	Ovens.		Coal used (short tons).	Yield of coal in coke (per cent.)	Coke produced (short tons).	Total value of coke.	Value of coke per ton.
		Built.	Building.					
1912.								
Alabama,	46	10,208	100	4,585,498	64.9	2,975,489	$8,098,412	$2.72
Colorado,	15	3,588	0	1,473,112	66.0	972,941	3,043,994	3.13
Georgia,	2	251	0	87,300	50.0	43,158	161,842	3.75
Illinois,	6	594	40	2,316,307	76.2	1,764,944	8,069,903	4.57
Indiana,	4	642	169	3,198,874	81.8	2,616,339	12,528,685	4.79
Kentucky,	9	1,049	291	307,162	62.4	191,555	513,734	2.68
Montana,	4	451	3	0	0	0	0	0
New Mexico,	4	1,030	0	679,209	60.9	413,906	1,356,946	3.28
New York,	4	555	0	1,095,198	72.6	794,618	3,203,133	4.03
Ohio,	7	471	119	561,426	69.2	388,669	1,365,905	3.51
Oklahoma,	2	260	0	0	0	0	0	0
Pennsylvania,	277	53,756	1,887	41,268,532	66.5	27,438,693	56,336,255	2.05
Tennessee,	15	2,584	0	685,861	54.0	370,076	951,853	2.57
Virginia,	18	5,408	0	1,555,969	62.2	967,947	1,815,975	1.88
Washington,	6	313	0	78,693	62.6	49,260	279,105	5.67
West Virginia,	129	19,064	0	4,061,702	60.7	2,465,986	4,692,393	1.90
Kansas,								
Maryland,								
Massachusetts,								
Michigan,	11	2,006	174	3,623,019	69.8	2,530,018	9,386,978	3.71
Minnesota,								
New Jersey,								
Utah,								
Wisconsin,								
Total,	559	102,230	2,783	65,577,862	67.1	43,983,599	111,805,113	2.54

MANUFACTURER OF COKE, BY STATES, 1912 AND 1913.—Continued.

State.	Establishments.	Ovens.		Coal used (short tons).	Yield of coal in coke (per cent.)	Coke produced (short tons).	Total value of coke.	Value of coke per ton.
		Built.	Building.					
1913.								
Alabama, ...	46	10,284	20	5,218,323	63.6	3,323,664	9,627,170	2.90
Colorado, ...	15	3,588	0	1,349,743	65.1	879,461	2,815,134	3.20
Georgia, ...	2	251	0	82,871	51.5	42,747	186,304	4.35
Illinois, ...	4	568	58	2,481,198	74.9	1,859,553	8,593,581	4.62
Indiana, ...	5	749	41	3,535,136	77.1	2,727,025	13,182,136	4.83
Kansas, ...	1	2	0	0	0	0	0	0
Kentucky, ...	9	1,049	100	512,245	61.9	317,084	753,897	2.38
Missouri, ...	0	0	56	0	0	0	0	0
Montana, ...	3	351	0	0	0	0	0	0
New Jersey, ...	1	150	0	339,351	75.4	255,792	695,041	2.72
New Mexico, ...	4	1,030	0	788,172	59.4	467,945	1,548,536	3.31
New York, ...	4	555	0	1,067,207	71.1	758,486	3,301,400	4.35
Ohio, ...	7	471	119	507,417	69.3	351,846	1,231,554	3.50
Oklahoma, ...	2	260	0	0	0	0	0	0
Pennsylvania, ...	276	55,058	582	43,195,801	66.6	28,753,444	67,929,864	2.36
Tennessee, ...	15	2,427	0	694,085	52.5	364,578	925,430	2.50
Virginia, ...	18	5,695	100	2,015,259	64.7	1,303,603	2,840,275	2.18
Washington, ...	6	331	0	118,786	64.2	76,221	432,770	5.68
West Virginia, ...	124	17,826	35	4,034,251	61.3	2,472,752	5,504,416	2.23
Maryland, ...	.....	.....	.....	.....	.....	.....	.....	.....
Massachusetts, ...	.....	.....	.....	.....	.....	.....	.....	.....
Michigan, ...	9	2,065	210	3,299,345	71.1	2,345,329	9,354,765	3.99
Minnesota, ...	.....	.....	.....	.....	.....	.....	.....	.....
Utah, ...	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin, ...	.....	.....	.....	.....	.....	.....	.....	.....
Total, ...	551	102,650	1,321	69,239,190	66.9	46,299,530	128,922,273	2.78

The following table gives the quantity of coke produced and the value of the same together with the average price for each year since 1880.

QUANTITY, VALUE AND AVERAGE PRICE OF COKE PRODUCED IN THE UNITED STATES, 1880 TO 1913.

Year.	Quantity, Short Tons.	Value.	Price Per Ton.
1880,	3,338,300	$6,631,265	$1.99
1881,	4,113,760	7,725,175	1.88
1882,	4,793,321	8,462,167	1.77
1883,	5,464,721	8,121,607	1.49
1884,	4,873,805	7,242,878	1.49
1885,	5,106,696	7,629,118	1.49
1886,	6,845,369	11,153,366	1.63
1887,	7,611,705	15,321,116	2.01
1888,	8,540,030	12,445,963	1.46
1889,	10,258,022	16,630,301	1.62
1890,	11,508,021	23,215,302	2.02
1891,	10,352,688	20,393,216	1.97
1892,	12,010,829	23,536,141	1.96
1893,	9,477,580	16,523,714	1.74
1894,	9,203,632	12,328,856	1.34
1895,	13,333,714	19,234,319	1.44
1896,	11,788,773	21,660,729	1.84
1897,	13,288,984	22,102,514	1.66
1898,	16,047,209	25,586,699	1.59
1899,	19,668,569	34,670,417	1.76
1900,	20,533,348	47,443,331	2.31
1901,	21,795,883	44,445,923	2.04
1902,	25,401,736	63,339,167	2.49
1903,	25,274,281	66,498,664	2.63
1904,	23,661,106	46,144,941	1.95
1905,	22,231,129	72,476,196	2.25
1906,	36,401,217	91,476,196	2.52
1907,	40,779,564	111,539,126	2.74
1908,	26,033,518	62,483,983	2.40
1909,	39,315,065	89,965,483	2.29
1910,	41,708,810	99,742,701	2.39
1911,	35,551,489	84,130,849	2.37
1912,	43,983,599	111,805,113	2.54
1913,	46,299,530	128,922,273	2.78

The quantity of coke produced in Pennsylvania in 1913 was 28,753,444 short tons with a value of $67,929,864, being the maximum both in quantity and value. The production during 1913 was marked by the increase in value as compared with the increase in production, the former being 4.8 per cent. while the latter was 20.6 per cent. Another factor to be noted was the growing importance of the Lower Connellsville district, which in 1913 produced 78 per cent. as much coke as the Connellsville district and almost one-third of the entire output of the State.

In 1912 there were 53,756 ovens in Pennsylvania, which increased in 1913 to 55,058. Of this number 9,432 were idle throughout the year, nearly one-half of them in the Connellsville district, where 19 establishments were idle throughout the year. There were 257 active establishments with 45,626 ovens, having an average of 630 tons per oven. Of the active ovens 1,467 were by-product ovens, which produced 2,628,680 tons of coke or 9.1 per cent. of the total. The average production of the beehive ovens was 592 tons.

The following table gives the statistics of the production of coke in Pennsylvania for the years 1880, 1890, 1900 and the last five years.

STATISTICS OF THE MANUFACTURE OF COKE IN PENNSYLVANIA, 1800-1913.

Year.	Establishments.	Ovens.		Coal used (short tons).	Yield of coal in coke (per cent.)	Coke produced (short tons).	Total value of coke at ovens.	Value of coke at ovens per ton.
		Built.	Building.					
1880,	124	9,501	836	4,347,558	65.0	2,821,384	$5,255,040	$1.86
1890,	166	23,430	74	13,046,143	65.6	8,560,215	16,333,674	1.91
1900,	177	32,548	2,310	20,239,966	66.0	13,337,295	29,692,258	2.22
1909,	283	54,506	2,072	36,983,568	67.3	24,905,525	50,377,035	2.02
1910,	288	55,956	1,334	39,455,785	66.7	26,315,607	55,254,599	2.10
1911,	279	54,904	1,271	32,875,655	66.7	21,923,935	43,053,367	1.96
1912,	277	53,756	1,887	41,268,532	66.5	27,438,693	56,336,255	2.05
1913,	276	a55,058	b582	43,195,801	66.6	28,753,444	67,929,864	2.36

aIncludes 932 United-Otto, 360 Semet-Solva, 150 Didier, and 5,059 rectangular ovens.
bIncludes 512 rectangular ovens.

With the exhaustion of much of the better coking coal and the increased demand for coke there has been a continuing increase in the amount of coal washed in Pennsylvania and the following table gives the character of the coal used since 1890.

CHARACTER OF COAL USED IN THE MANUFACTURE OF COKE IN PENNSYLVANIA SINCE 1890—IN SHORT TONS.

Year.	Run of Mine.		Slack.		Total.
	Unwashed.	Washed.	Unwashed.	Washed.	
1890,	11,788,625	303,591	630,195	323,732	13,046,143
1895,	13,618,376	34,728	440,869	117,594	14,211,567
1900,	17,692,623	647,045	1,300,796	599,502	20,239,966
1905,	26,148,696	1,335,631	2,436,621	1,109,397	31,030,345
1909,	31,712,482	2,278,927	1,016,576	1,975,583	36,983,568
1910,	32,688,029	2,372,115	1,275,348	3,120,293	39,455,785
1911,	27,601,050	1,958,360	1,029,149	2,287,096	32,875,655
1912,	35,344,633	2,493,661	1,098,392	2,331,846	41,268,532
1913,	36,621,183	2,191,944	1,199,859	3,182,815	43,195,801

In 1913 the Connellsville and Lower Connellsville districts, both included in Fayette and Westmoreland counties, produced 45 per cent. of the entire coke production of the United States.

There is a growing proportion of the coke produced in this country in by-product ovens. It has been 21 years since the first by-product coke plant was erected in the United States, consisting of 12 Semet-Solvay retorts, at Syracuse, New York. The second by-product plant was constructed in 1895 at Johnstown, Pa., consisting of 60 Otto-Hoffman ovens. This plant has since been increased three times, to 160 ovens in 1899, to 260 in 1904, and to 372 in 1907.

The total displacement of the wasteful beehive oven by the retort oven is indicated by the history of the past 21 years. The presence of the beehive ovens in the Connellsville and Lower Connellsville region has been due to the fact that the coal there is an ideal beehive oven coal. The ovens are cheaply constructed and the coking districts are within a short distance of the greatest iron producing centre of the world. The life of the Connellsville district proper is rapidly drawing to a close, and the owners of the coking plants do not feel justified in sacrificing the capital invested in the beehive ovens for the advantages which would accrue from construction of the by-product style.

The following table gives the location and character, and other information relative to the several by-product plants in Pennsylvania.

RETORT COKE OVEN PLANTS IN PENNSYLVANIA.

Town.	System.	Name of Company Owning Plant.	Number of Installments.	Date Put in Operation.	No. of Ovens.	Uses of Coke.	Uses of Surplus Gas.
Dunbar, ...	Semet-Solvay, ...	Dunbar Furnace Co.,	First, ...	Aug., 1896,..	50	Blast furnaces, ...	Fuel.
Dunbar, ...	Semet-Solvay, ...	Dunbar Furnace Co.,	Second, ...	July, 1903,..	60	Blast furnaces, ...	Fuel.
Chester, ...	Semet-Solvay, ...	The Phila. Suburban Gas & Electric Co.	First, ...	April, 1904,..	40	Blast furnaces, ...	Illuminating and fuel.
South Sharon, ...	United-Otto, ...	Carnegie Steel Co....	First, ...	July, 1903,..	212	Blast furnaces, ...	Fuel.
Glassport, ...	Otto-Hoffman, ...	Pittsburgh Gas & Coke Co.	First, ...	Feb., 1897,..	120	Blast furnace and domestic. Installed a cruching outfit in 1905.	Illuminating gas and fuel gas to McKeesport.
Johnstown, ...	Otto-Hoffman, ...	Cambria Steel Co., ..	First, ...	Nov., 1895,..	60	Blast furnace, ...	Fuel and power.
Johnstowa, ...	United-Otto, ...	Cambria Steel Co., ..	Second, ...	Mar., 1899,..	100	Blast furnace, ...	Fuel and power.
Johnstown, ...	United-Otto, ...	Cambria Steel Co., ..	Third, ...	Sept., 1904,..	100	Blast furnace, ...	Fuel and power.
Johnstown, ...	United-Otto, ...	Cambria Steel Co., ..	Fourth, ...	Feb., 1907,..	112	Blast furnace, ...	Fuel and power.
Lebanon, ...	Semet-Solvay, ...	Pennsylvania Steel Co.	First, ...	July, 1904,..	90	Blast furnace, ...	Semet-Solvay delivers surplus gas to Pennsylvania Steel Co., which sells it to American Iron & Steel Mfg. Co. for use in heating furnaces and gas engine. Also 4 gas engines 1,200 H. P. each, furnishing power for generating electricity to operate Cornwall Ore Banks, Lebanon, Pa.
Lebanon, ...	Otto-Hoffman, ...	Lackawanna Iron & Steel Co.	First, ...	Mar., 1903,..	228	Blast furnace, ...	Fuel.
Steelton, ...	Semet-Solvay, ...	Pennsylvania Steel Co.	First, ...	Jan., 1907,..	120	Blast furnace, ...	Fuel.
South Bethlehem, ...	Didier, ...	Lehigh Coke Co., ...	First, ...	1912, ...	150	.....	Fuel.

It has been customary to consider the coke production of Pennsylvania by well defined districts. These districts are based to some extent upon geographic boundaries, but take into consideration the character of the coal mined and the quality of the coke produced. The following statement describes the districts as they are now divided.

"The Allegheny mountain district includes the ovens along the line of the Pennsylvania Railroad from Gallitzin eastward over the crest of the Alleghanies to a point beyond Altoona. The Allegheny Valley district formerly included the coke works of Armstrong and Butler counties and one of those in Clarion county, the other ovens in the latter county being included in the Reynoldsville-Walston district. All but two of the Allegheny Valley plants have been abandoned, and the production is combined with that of the Allegheny mountain district. What was previously known as the Beaver district included the ovens in Beaver and Mercer counties, but all the ovens in Beaver county have been abandoned,* those formerly operated by the Semet-Solvay Co. in Mercer county have been abandoned, and the operations of the one establishment of the United-Otto ovens at South Sharon are now included in the Pittsburgh district. The Blossburg and the Broad Top districts embrace the Blossburg and the Broad Top coal fields. The ovens of the Clearfield-Centre district are chiefly in the two counties from which it derives its name. The Connellsville district is the well known region of western Pennsylvania in Westmoreland and Fayette counties, extending from just south of Latrobe to Fairchance. The Lower Connellsville region is entirely in Fayette county and southwest of the Connellsville basin proper, from which it is separated by the Greensburg anticline. It embraces the important developments in the vicinity of Uniontown and is now the second producing district of the State. The Greensburg, Irwin, Pittsburgh and Reynoldsville-Walston districts include the ovens near the towns which have given the names to these districts. The Upper Connellsville district, sometimes called the Latrobe district, is near the town of Latrobe. The Semet-Solvay ovens at Chester, Steelton, and Lebanon, the 300 Didier ovens at South Bethlehem, and the United-Otto ovens at Lebanon are in what has been designated as the Lebanon-Schuylkill district."

*Two New plants have been erected, both using coal from outside of Beaver county.

The following table gives the details concerning the coke production in each of the several districts of Pennsylvania in 1912 and 1913.

COKE PRODUCTION IN PENNSYLVANIA IN 1912 AND 1913, BY DISTRICTS.

District.	Establishments.	Ovens.		Coal used (short tons).	Yield of coal in coke (per cent.)	Coke produced (short tons).	Total value of coke at ovens.	Value of coke per ton.
		Built.	Building.					
1912.								
Allegheny Mountain,	25	2,483	0	1,252,141	69.6	870,951	$2,384,725	$2.74
Allegheny Valley,	2	52	0	0	0	0	0	0
Connellsville,	109	22,219	148	17,772,202	66.5	11,814,588	22,463,602	1.90
Lower Connellsville,	74	15,527	422	13,456,074	67.1	9,023,371	17,166,837	1.90
Greensburg,	7	2,040	0	1,358,845	65.8	894,271	1,883,068	2.11
Irwin,	2	289	0	0	0	0	0	0
Pittsburgh,	11	3,724	796	3,560,298	64.6	2,301,362	5,813,575	2.53
Reynoldsville-Walston,	10	2,881	260	1,211,655	57.9	701,667	1,586,844	2.26
Upper Connellsville,	22	2,749	143	1,120,295	68.1	762,700	1,564,457	2.05
Lebanon and Schuylkill Valley,	5	628	150	1,215,146	70.9	861,072	2,917,244	3.39
Broadtop,	.....	.....	.....	.....	.....	.....	.....	.....
Clearfield-Center,	10	1,166	28	321,876	64.8	208,711	555,903	2.66
Total,	277	53,756	1,887	41,268,532	66.5	27,438,693	$56,336,255	$2.05
1913.								
Allegheny Mountain and Allegheny Valley,	27	a2,505	0	1,300,110	69.0	897,913	$2,618,932	$2.91
Connellsville,	106	b22,189	60	17,379,314	66.6	11,566,778	25,830,382	2.23
Lower Connellsville,	75	c15,736	d440	13,498,088	66.5	8,976,781	19,868,322	2.21
Pittsburgh,	14	e4,554	0	4,258,903	64.7	2,756,954	7,438,745	2.70
Upper Connellsville,	21	f2,828	g82	1,244,230	65.9	820,192	1,811,353	2.21
All other districts,	33	h7,246	0	5,515,156	68.1	3,734,826	10,362,130	2.77
Total,	276	55,058	582	43,195,801	66.6	28,753,444	$67,929,864	$2.36

aIncludes 372 United-Otto ovens.
bIncludes 110 Semet-Solvay and 1,132 rectangular ovens.
cIncludes 2,271 rectangular ovens.
dRectangular ovens.
eIncludes 332 United-Otto and 1,135 rectangular ovens.
fIncludes 210 rectangular ovens.
gIncludes 72 rectangular ovens.
hIncludes 250 Semet-Solvay, 228 United-Otto, 360 Didier, and 311 rectangular ovens.

The following quotation from the report of Mr. Parker, of the United States Geological Survey, gives in detail the facts concerning the Connellsville and Lower Connellsville districts for the year 1913:

"Connellsville District. The Connellsville district of Pennsylvania continues to be the most important coke-producing district of the world, though in the last few years it has been gradually losing its relatively exalted position in the coke production of the United States. This relative retrogression may be expected to continue as this wonderful portion of the great Pittsburgh bed approaches exhaustion, an eventuality which, according to conservative estimates, is only three or four decades distant. The beginning of the decline may have already begun, for in 1913, when for the greater part of the year prices were exceptionally high and when production for the State as a whole

showed a gain of practically 5 per cent., the output in the Connellsville district decreased nearly 250,000 tons.

"There were fewer ovens in the Connellsville region in 1913 than in any year since 1905, and the number has been decreasing steadily for the last three years from the maximum of 24,481 ovens in 1910. In 1913 there were 22,189 ovens in the Connellsville region, 30 fewer than in 1912. There were only 148 ovens building at the close of 1912, and only 60 ovens at the close of 1913. The number of establishments has decreased with the number of ovens, there being 106 coke-making plants in the Connellsville district in 1913 against 109 in 1912. Of the 106 plants, with 22,189 ovens, in existence at the close of 1913, 1 plant, with 42 ovens, was idle throughout the year, in addition to which there was 4,264 idle ovens at plants portions of which were in operation. Altogether there were 17,883 ovens in the Connellsville district making coke in 1913. They produced a total of 11,566,778 tons of coke, or an average of 647 tons per oven. In 1912 there were 18,151 active ovens, producing 11,814,588 tons of coke, or an average of 651 tons per oven. The average value per ton for coke made in Pennsylvania was $2.05 in 1912 and $2.36 in 1913. The average value of Connellsville coke was $2.23 in 1913 against $1.90 in 1912. The apparent lower value for Connellsville coke is due to including in the total production the output from a number of by-product plants located at distances from the mines, where the expense of transportation of the coal is added to the cost thereof, and is naturally reflected in the higher prices for the coke at the ovens. The total quantity of the retort-oven coke in Pennsylvania was 2,628,680 short tons, valued at $8,238,924, or an average of $3.13 per ton, which had the effect of increasing the average value per ton of all the coke produced in the State. Of the 22,189 ovens in the Connellsville district, only 110 are of the by-product recovery type. These are Semet-Solvay ovens operated by the Semet-Solvay Co. at Dunbar. A few rectangular, or Mitchell, ovens have been constructed in the district, but in them, as in the beehive ovens, the process is one of partial combustion and not of distillation.

"The following table, compiled by the Courier, of Connellsville, Pa., shows the shipments of coke, by months, from the Connellsville and the Lower Connellsville districts. The figures are given in cars and tons, with the average number of cars shipped each working day of the month, and include shipments from the Lower Connellsville district as well as from the Connellsville district proper. This authority gives the shipments in 1913 at 20,078,679 short tons, whereas the combined production of the Connellsville and Lower Connellsville district as reported to the Geological Survey amounted to 20,543,559 tons. It will be noted that in the first seven months of 1913, with one exception—April—the shipments exceeded those of

1912. The falling off in the demand for coke following the slump in the iron trade in October is exhibited in these statistics for 1913 by a decrease of 90,000 tons in the shipments for October, 260,000 tons in the shipments for November, and of nearly 400,000 tons in the shipments for December. The heaviest shipments in 1913 were in the month of January, 1,867,336 tons; in 1912 the largest shipments were in October, 1,793,432 tons. The average daily records of shipments in 1913 was 1,950 cars; in 1912 the average daily shipments were 1,911 cars. The highest average daily shipments were in February, 2,114 cars, and the smallest daily car record was made in December, 1,365 cars. The largest shipment of cars in any month during the last three years occurred in January of 1913, 55,148 cars; the smallest number was in December of 1913, 35,506 cars.

"The monthly shipments from this region from 1909 to 1913 inclusive, reported by the Courier, are given in the following table:

MONTHLY SHIPMENTS OF COKE FROM THE CONNELLSVILLE AND LOWER CONNELLSVILLE REGIONS, 1909-1913, IN SHORT TONS.

Month.	1909.	1910.	1911.	1912.	1913.
January,	1,205,650	1,952,406	1,194,047	1,575,198	1,867,336
February,	1,143,487	1,787,164	1,302,098	1,583,567	1,716,525
March,	1,185,814	1,922,575	1,621,301	1,750,944	1,777,977
April,	1,144,751	1,754,654	1,419,369	1,710,417	1,707,727
May,	1,235,044	1,527,515	1,343,879	1,778,860	1,823,674
June,	1,429,289	1,544,964	1,299,295	1,621,004	1,687,486
July,	1,605,937	1,446,294	1,257,820	1,565,126	1,717,683
August,	1,641,287	1,461,060	1,355,774	1,690,681	1,690,636
September,	1,704,919	1,390,140	1,394,752	1,553,246	1,622,630
October,	1,821,444	1,450,717	1,424,232	1,793,432	1,703,438
November,	1,835,745	1,252,797	1,385,627	1,736,938	1,473,484
December,	1,832,465	1,196,436	1,335,974	1,672,862	1,289,983
Total,	17,785,832	18,689,722	16,334,168	20,032,275	20,078,579

"The total shipments in cars for the last 26 years, the total number of cars in 1912 and 1913, the daily car average and the total number of tons shipped, as reported by the Courier, are shown in the following tables:

TOTAL AND DAILY AVERAGE SHIPMENTS IN CARS, 1888-1913.

Year.	Daily average.	Total cars.	Year.	Daily average.	Total cars.	Year.	Daily average.	Total cars.
1888,	905	282,441	1897,	1,181	367,383	1906,	2,385	745,274
1889,	1,046	326,220	1898,	1,415	441,249	1907,	2,210	691,757
1890,	1,147	355,070	1899,	1,676	523,203	1908,	1,173	368,222
1891,	884	274,000	1900,	1,619	504,410	1909,	1,920	600,979
1892,	1,106	347,012	1901,	1,857	581,051	1910,	1,923	598,706
1893,	874	270,930	1902,	1,986	624,198	1911,	1,570	488,672
1894,	900	281,677	1903,	1,782	558,738	1912,	1,911	595,336
1895,	1,410	441,243	1904,	1,623	510,759	1913,	1,950	582,071
1896,	920	289,137	1905,	1,886	688,328			

SHIPMENTS OF COKE FROM THE CONNELLSVILLE REGION, INCLUDING THE LOWER CONNELLSVILLE DISTRICT, IN 1912 AND 1913, BY MONTHS.

Month.	1912.			1913.		
	Cars.	Daily car average.	Short tons.	Cars.	Daily car average.	Short tons.
January,	46,537	1,723	1,546,892	55,148	2,042	1,868,149
February,	47,212	1,888	1,560,182	50,736	2,114	1,715,917
March,	52,015	2,000	1,747,959	51,454	1,979	1,728,709
April,	50,862	1,956	1,697,734	51,026	1,963	1,730,183
May,	53,142	1,968	1,776,415	53,287	1,974	1,817,805
June,	48,959	1,958	1,635,824	49,144	1,966	1,685,637
July,	46,723	1,797	1,564,377	49,223	1,823	1,710,435
August,	50,241	1,861	1,704,307	48,730	1,874	1,696,368
September,	45,753	1,830	1,555,483	47,150	1,813	1,649,368
October,	52,443	1,940	1,782,302	48,695	1,803	1,719,045
November,	51,261	1,971	1,736,888	41,972	1,679	1,496,000
December,	50,185	2,007	1,692,510	35,506	1,305	1,280,287
Total,	595,336	1,911	20,300,873	582,071	1,950	20,097,901

"As Connellsville coke is recognized as the standard for the United States and governs largely the prices for the product of other districts, the following table is given showing the prices for furnace and foundry coke, by months, during the years 1911 to 1913. These prices are quoted from The Iron Age and are for strict Connellsville coke. 'Main Line' and 'outside' cokes are usually quoted from 15 to 20 cents below the strict Connellsville.

"During the last three years there seems to have been some disposition to get away from the buying of coke on six months' contract for delivery, and accordingly two sets of statistics for prices have developed—one for spot coke and one for contract, usually made for six months at a time. As a general thing the contract prices are higher than spot, the latter being frequently made on unsold coke which happens to be thrown upon the market, but not always so. During 1911 the prices for Connellsville coke were low. Spot coke ranged steadily below contracts. In the latter part of 1912, however, and in January of 1913 spot coke was in active demand and famine prices were realized, from $4.25 to $4.50 being obtained for spot coke, while a portion of the deliveries were on contracts made the previous summer, when prices were from $2.40 to $2.50 per ton. The steady advance in prices in 1912 and the almost equally steady decline in 1913 are clearly exhibited in this statement. The high average of the spot furnace coke in 1912 was $3.85 to $4.00 in November, and the high average for 1913 was in Janary, $3.50 to $4.15. The average value per ton for Connellsville coke was $1.90 in 1912 and $2.23 in 1913, from which it appears that the price quotations do not exactly harmonize with the actual receipts by the producers.

PRICES OF CONNELLSVILLE FURNACE AND FOUNDRY COKE PER SHORT TON AT OVENS, 1911-1913, BY MONTHS.

	1911.		1912.		1913.	
	Spot.	Contract.	Spot.	Contract.	Spot.	Contract.
Furnace.						
January,	$1.40 to $2.50	$1.70 to $2.00	$1.75 to $1.85	$1.65 to $1.70	$3.50 to $4.15	$3.15 to $3.25
February,	1.45 to 1.55	1.70 to 1.75	1.75 to 1.80	1.75 to 1.80	2.25 to 3.00	2.50 to 3.00
March,	1.50 to 1.65	1.70 to 2.00	1.85 to 2.25	1.75 to 1.80	2.30 to 2.40	2.50
April,	1.60 to 1.65	1.80 to 2.00	2.10 to 2.60	2.15 to 2.25	2.00 to 2.25	2.25
May,	1.50 to 1.65	1.75 to 1.85	2.10 to 2.50	2.25 to 2.35	2.00 to 2.20	2.25
June,	1.40 to 1.50	1.55 to 1.85	1.90 to 2.10	2.25 to 2.35	2.10 to 2.15	2.25
July,	1.45 to 1.55	1.55 to 1.75	2.15 to 2.25	2.25	2.25 to 2.50	2.25 to 2.50
August,	1.45 to 1.55	1.60 to 1.65	2.15 to 2.25	2.25	2.50	2.50
September,	1.50 to 1.55	1.60 to 1.70	2.15 to 2.50	2.25 to 2.50	2.15 to 2.50	2.25 to 2.50
October,	1.50 to 1.55	1.55 to 1.70	2.65 to 4.00	2.50 to 3.00	2.00 to 2.15	2.10 to 2.25
November,	1.50 to 1.80	1.60 to 1.75	4.00	3.25	1.75	1.90 to 2.00
December,	1.50 to 1.80	1.60 to 1.75	4.00	3.25	1.75	1.80 to 1.85
Foundry.						
January,	$1.90 to $2.50	$2.25 to $2.50	$1.90 to $2.00	$2.10 to $2.15	$4.25 to $4.50	$3.60 to $4.00
February,	2.10 to 2.50	2.25 to 2.50	2.00 to 2.25	2.10 to 2.25	3.00 to 3.50	3.00 to 3.50
March,	2.00 to 2.50	2.25 to 2.40	2.25 to 2.75	2.25 to 2.50	3.00	3.00
April,	2.00 to 2.00	2.25 to 2.40	2.50 to 2.75	2.50 to 2.75	3.00	3.00
May,	1.75 to 2.00	2.10 to 2.40	2.50 to 2.75	2.40 to 2.65	2.75 to 3.00	2.90 to 3.00
June,	1.75 to 2.00	2.00 to 2.40	2.40	2.40 to 2.60	2.75 to 2.85	3.00
July,	1.87 to 2.00	2.10 to 2.40	2.40	2.40 to 2.60	2.75	3.00
August,	1.95 to 2.00	2.00 to 2.50	2.40	2.50	2.90	3.00
September,	1.85 to 2.00	2.10 to 2.40	2.40 to 2.75	2.50 to 2.75	2.90	3.00
October,	1.85 to 2.00	2.10 to 2.40	3.00 to 4.25	3.00 to 3.75	2.75 to 2.90	3.00
November,	1.85 to 2.00	2.10 to 2.40	4.25	3.75	2.50 to 2.65	2.75
December,	1.90 to 2.00	2.10 to 2.25	4.25 to 4.50	3.75 to 4.00	2.50	2.60 to 2.75

"*Lower Connellsville District.* This district is now the second in importance among the coke-making districts of the United States. It bids fair to rival the Connellsville district within a few years. The first ovens were built in 1900, so that at the close of 1913 the district was only a little more than 13 years old. The production in 1912 was 9,023,371 short tons and in 1913 it was 8,976,781, indicating a slight decrease. The value, however, increased from $17,166,837 in 1912 to $19,868,322, the average price per ton rising from $1.90 in 1912 to $2.21 in 1913.

"There was a gain of 211 in the total number of ovens in existence at the close of the year, as against a decrease of 30 ovens in the Connellsville district, and there were 440 ovens building at the close of the year in contrast with only 60 building in the Connellsville district. The number of establishments in the Lower Connellsville district increased from 74 to 75. There were 2 idle establishments with a total of 86 ovens, and 1,377 additional ovens idle belonging to plants operated for a portion of the year. The rectangular or Mitchell ovens have found their greatest favor in the Lower Connellsville district, there being 2,271 of this type in existence at the close of the year and 430 building. There are no by-product recovery ovens in the district.

"The record of coke production in the Lower Connellsville district in 1900, 1905, and from 1909 to 1913 is as follows:

STATISTICS OF THE MANUFACTURE OF COKE IN THE LOWER CONNELLSVILLE DISTRICT, PENNSYLVANIA, 1900, 1905 AND 1909-1913.

Year.	Establishments.	Ovens.		Coal used (short tons).	Yield of coal in coke (per cent.)	Coke produced (short tons).	Total value of coke at ovens.	Value of coke at ovens, per ton.
		Built.	Building.					
1900,	12	2,033	1,112	579,928	66.5	385,909	$792,886	$2.05
1905,	45	7,484	1,145	5,666,812	68.3	3,871,310	7,532,382	1.95
1909,	70	14,215	1,036	9,781,803	69.1	6,761,335	12,490,518	1.85
1910,	73	14,805	668	12,130,425	67.8	8,219,492	16,048,675	1.95
1911,	71	14,857	654	10,771,495	68.3	7,354,736	12,998,192	1.77
1912,	74	15,525	422	13,456,074	67.1	9,023,371	17,166,837	1.90
1913,	75	a15,736	b440	13,498,088	66.5	8,976,781	19,868,322	2.21

aIncludes 2,271 rectangular ovens. bRectangular ovens.

"The combined production of the Connellsville, Upper Connellsville and Lower Connellsville districts in 1913 amounted to 21,363,751 tons, as compared with 21,600,659 tons in 1912. All the other coke producing districts in Pennsylvania, including the by-product ovens at Lebanon, Steelton, South Bethlehem, and Chester, amounted to 7,389,693 short tons, valued at $20,419,807. The three Connellsville districts produced 74 per cent. of the total for Pennsylvania."

PETROLEUM.

The estimated total production of petroleum in the United States up to the close of 1913 was over 3,000,000,000 barrels, of which Pennsylvania had produced over 745,000,000 barrels, more than 25 per cent. of the total. From the beginning of the production of petroleum in the United States in 1859, Pennsylvania, including the little production of New York, was the only producer until 1876. During these seventeen years there had been a gradual increase in production from nothing to almost 9,000,000 barrels in 1875, the greatest production in this period being in 1874, when almost 11,000,000 barrels were produced.

The maximum production from Pennsylvania and New York fields was in the year 1891, when the output exceeded 33,000,000 barrels, since which time the production has gradually decreased, with few

unimportant exceptions Since the year 1900 there has been a continuing decrease of production from 14,559,127 barrels to 8,712,076 barrels in 1912. There was a very slight increase in 1913, the output being 8,865,495 barrels.

The total production in Pennsylvania in 1913 was 7,963,282 barrels as compared with 7,837,948 barrels in 1912. This was a gain of 1.60 per cent. in quantity. The total value of the production in 1912 was $12,886,752, an average of $1.64, which rose in 1913 to $19,805,452, an average of $2.49.

The slight increase in production, which overcame the usual decline for more than a decade, was due to the activity induced by the high price of oil which ranged from $2.00 the first year to $2.50 during the last ten months. The increased output, however, was by no means all due to the drilling of new wells, but much of it to the careful cleaning out of wells which had been practically abandoned, perhaps for several years. It must be recognized by every one that the oil territory in Pennsylvania has been well defined, and that the pools generally have long passed their prime, and there is very little hope of increasing the production materially by the development of any new pools. While there were many wells drilled in Pennsylvania in 1913, yet none of them were of really large size. A few in Washington county started off at 35 to 50 barrels per day. One well which started off at 250 barrels was found near Duff City, in Allegheny county. This well rapidly declined, and no large producers were found surrounding it. Other wells ranged from 15 to 35 barrels. The average initial production from new wells was but 2.6 barrels per day.

The following table gives the production of petroleum in Pennsylvania for the years 1909-1913 by months.

PRODUCTION OF PETROLEUM IN PENNSYLVANIA IN 1909-1913, BY MONTHS, IN BARRELS.

Month.	1909.	1910.	1911.	1912.	1913.
January,	759,178	721,627	697,290	562,665	673,011
February,	704,391	621,467	637,719	575,180	581,040
March,	822,600	851,225	722,755	686,178	640,858
April,	784,155	766,709	701,489	699,856	707,638
May,	818,359	759,585	765,470	728,127	704,527
June,	820,155	799,520	704,082	657,545	665,380
July,	792,327	723,646	668,324	678,789	692,210
August,	786,563	763,273	704,627	675,848	656,835
September,	774,750	720,165	661,775	634,114	655,137
October,	758,779	708,453	690,360	686,184	698,052
November,	765,504	678,132	622,543	610,314	612,732
December,	712,642	689,869	671,724	643,148	675,871
Total,	9,299,403	8,794,662	8,248,158	7,837,948	7,963,282

The total number of wells drilled in Pennsylvania and New York in 1913 was 4,251 as compared with 2,472 in 1912. There is no information available as to the number of old wells that were cleaned out and put to active pumping.

The following table gives the statistics of completions of wells in Pennsylvania and New York for the years 1909 and 1913, by districts.

NUMBER OF WELLS COMPLETED IN THE PENNSYLVANIA AND NEW YORK OIL FIELDS, 1909-1913, BY DISTRICT.

District.	Oil.					Dry.					Total Completed.a				
	1909.	1910.	1911.	1912.	1913.	1909.	1910.	1911.	1912.	1913.	1909.	1910.	1911.	1912.	1913.
Bradford,	535	316	260	335	675	36	6	16	14	31	571	344	298	371	755
Allegheny,	419	219	128	177	441	40	13	9	17	22	459	283	194	246	509
Middle,	441	195	208	226	352	65	34	39	36	66	506	235	247	266	435
Venango and Clarion,	1,682	635	642	853	1,352	199	70	93	99	141	1,881	790	805	1,019	1,578
Butler and Armstrong,	309	152	124	138	354	178	89	65	59	110	487	263	219	216	497
Southwest Pennsylvania,	174	156	129	182	246	145	76	75	106	151	319	286	244	354	477
Total,	3,560	1,673	1,491	1,911	3,420	a663	b288	b297	b322	b521	4,223	2,201	2,007	2,472	4,251

aIncluding gas wells. bNot including gas wells.

The following table gives the total and average daily production of new wells in Pennsylvania and New York for the years 1909-1913 in barrels, from which it will be seen that the average output in 1913 was the lowest in this period of five years.

TOTAL AND AVERAGE INITIAL DAILY PRODUCTION OF NEW WELLS IN THE PENNSYLVANIA AND NEW YORK OIL FIELDS, 1909-1913, BY DISTRICTS, IN BARRELS.

District.	Total Initial Production.					Average Initial Production Per Well.				
	1909.	1910.	1911.	1912.	1913.	1909.	1910.	1911.	1912.	1913.
Bradford,	1,345	952	730	817	1,676	2.51	3.01	2.81	2.44	2.48
Allegheny,	815	368	201	278	820	1.94	1.68	1.57	1.57	1.86
Middle,	977	442	541	511	649	2.22	2.27	2.60	2.26	1.84
Venango and Clarion,	4,573	1,276	1,302	1,943	2,301	2.72	2.00	2.03	2.28	1.70
Butler and Armstrong,	2,493	1,489	422	696	1,487	8.07	9.80	3.40	5.04	4.20
Southwest Pennsylvania,	1,130	2,156	1,716	2,526	2,025	6.49	13.82	13.30	13.88	8.23
Total,	11,333	6,683	4,912	6,771	8,958	3.18	3.99	3.29	3.54	2.62

The oil industry in Pennsylvania commenced before the drilling of the Drake well. For a number of years there were several plants producing oil from various carbonaceous shales by distillation. The processes and appliances used were crude and the resultant products equally crude compared with the refinery products of to-day. There is but little known about these early shale oil enterprises, although some of them were quite successful. As a rule but three products were recovered:—illuminating oils, machine oils and a crude "creasote." The total recovery in some cases was as much as 40 gallons per ton of Cannel coal or of shales used. At that time no use was made of the unfixed or fixed gases, which were first driven off in the process of distillation, neither was any attempt made to utilize the lighter oils corresponding to the gasolines recovered from crude petroleum. In that early day it was not known that paraffine could be recovered from shales, nor was sulphate of ammonia manufactured as is now done most successfully in the Scottish shale oil industry.

It is well known that we have in Pennsylvania many very large deposits of highly carbonaceous shales which will furnish on destructive distillation probably twice, or more, oil in volume than is recovered in the successful shale oil industry in Scotland. With the declining production of high grade Apallachian petroleum attention should be given to these shale deposits which undoubtedly contain in the aggregate a number of times the entire amount of petroleum which has been produced in Pennsylvania during the last half century. The shale oil industry in Scotland is a thriving and prosperous one and is on the increase. Taking into consideration the character of the shales there used, the amount of oil recovered from them, and the cost of mining the shales, as compared with the cost of mining in Pennsylvania, and the amount of oil which it seems the Pennsylvania shales will produce, it would seem this industry is one that should be most thoroughly investigated. Preliminary studies on the subject are now under way by the Topographic and Geologic Survey.

NATURAL GAS.

The year 1913 was a record year for production of natural gas in Pennsylvania, the output reported being 118,860,269,000 cubic feet, with a value of $21,695,845, as compared with 112,000,000,000 cubic feet in 1912, with a value of $18,500,000.

In addition to the 4,000 and more wells drilled for oil in 1913 there were 1,270 wells drilled for gas. Of this number, 259 were dry holes and 1,011 were productive wells.

For many years Pennsylvania was the leading producer of natural gas, but has given way in this respect to West Virginia. The State still continues to be, however, the largest consumer of this fuel.

Of the wells drilled in 1913 some of them were comparable with the wells in the early history of the gas developments. In Clarion, Forest, Elk and Jefferson counties there are many wells where the rock pressure ranges from 300 to 700 or 800 pounds. In Elk county, at a depth of 2,450 to 3,000 feet, a number of wells were drilled with a rock pressure of 500 to 980 pounds, and even in Allegheny county wells were drilled with an initial rock pressure of 400 to 800 pounds.

The total consumption of natural gas in Pennsylvania in 1913 exceeded 177,000,000,000 cubic feet, with a value of $28,709,565, an average of $0.1618 per thousand cubic feet as compared with 173,000,000,000 cubic feet in 1912, valued at $26,486,302, an average of $0.1525 per thousand cubic feet.

Of the total consumption of gas, over three-fourths in quantity, or 130,000,000,000 cubic feet, was used for industrial purposes. This gas had a value of $16,185,087, or an average of $0.1238 per thousand cubic feet, as compared with a consumption of 124,000,000,000 cubic feet in 1912, with a value of $14,333,048, an average of $0.1153 per thousand cubic feet. Of the gas used for industrial purposes nearly 90 per cent. was used for manufacturing. The difference between the total amount of gas used and that used for industrial purposes represents the consumption for domestic uses.

The difference between the production of natural gas and the consumption does not represent the amount of gas brought into the State from West Virginia, for large quantities of gas are piped from Pennsylvania fields to New York, Ohio and some West Virginia points. The export of gas to New York exceeded 8,000,000,000 cubic feet. The difference between the production and the consumption (plus exports) shows that the quantity of gas piped from West Virginia in 1913 was 58,000,000,000 cubic feet, with a value of $7,000,000. This was a decrease from 1912, when 61,500,000,000 cubic feet were imported from West Virginia, with a value of almost $8,000,000. The quantity of gas imported from West Virginia is almost one-half of that produced in the State of Pennsylvania.

The following table gives the record of the number of wells in Pennsylvania, the gas produced, and that consumed, for the years 1897-1913.

RECORD OF THE NATURAL-GAS INDUSTRY IN PENNSYLVANIA, 1897-1913.

Year.	Gas Produced.		Gas Consumed.			Wells.		
			Number of Consumers.			Drilled.		
	Number of producers.	Value.	Domestic.	Industrial.	Value.	Gas.	Dry.	Productive Dec. 31.
1897, ...	176	$6,242,543	a201,059	1,124	$5,392,661	314	96	2,467
1898, ...	232	6,806,742	a213,410	1,021	6,064,477	373	74	2,840
1899, ...	281	8,337,210	a232,060	1,236	7,926,970	467	104	3,303
1900, ...	266	10,215,412	a229,730	1,296	9,812,615	513	142	3,776
1901, ...	296	12,688,161	a326,912	1,743	11,785,996	660	143	4,436
1902, ...	379	14,352,183	185,678	2,448	13,942,783	775	232	5,211
1903, ...	414	16,182,834	214,432	2,834	16,060,196	699	126	5,910
1904, ...	414	18,139,914	238,481	2,920	17,205,804	701	174	6,352
1905, ...	351	19,197,336	257,416	2,845	19,237,218	765	168	6,566
1906, ...	309	18,558,245	273,184	3,307	21,085,077	603	153	7,300
1907, ...	344	18,844,156	295,115	3,812	22,917,547	769	180	8,051
1908, ...	b572	19,104,944	307,585	4,577	20,678,161	571	147	c8,831
1909, ...	b777	20,475,207	294,781	5,377	21,639,102	756	166	c9,499
1910, ...	b819	21,057,211	321,430	4,102	23,934,691	857	161	c10,237
1911, ...	b1,067	18,520,796	330,537	4,597	23,940,001	832	224	c10,885
1912, ...	b1,104	18,539,672	345,765	3,442	26,486,302	993	219	c11,543
1913, ...	b1,174	21,695,845	400,823	4,373	28,709,565	1,011	259	c12,255

aNumber of fires supplied.

bIncludes 216 producers having shallow wells in Erie county for their own domestic consumption in 1908, 311 producers in 1909, 345 producers in 1910, 399 in 1911, and 401 in 1912 and 1913.

cIncludes 350 shallow wells in Erie county in 1908, 429 in 1909, 429 in 1910, 476 in 1911, and 492 in 1912 and 1913.

To maintain the output of natural gas it is necessary for the companies to hold large reserves of territory. In 1912 the various gas producers of Pennsylvania owned in fee 115,242 acres, they held under lease 1,675,116 acres, and owned the gas rights in 397,030 acres, or a total of 2,187,388 acres. In 1913 the acreage held in fee increased to 146,472 acres, that held by lease to 1,684,925 acres, and the area in which the producers held the gas rights decreased to 380,043 acres, giving a total acreage controlled by the various gas producers of 2,211,440.

It is almost impossible to separate the production of gas from that of petroleum. In 1912 the combined value of the output of natural gas and petroleum in Pennsylvania was $31,426,424, and in 1913 it was $41,501,297.

The following table shows the value of the natural gas production of Pennsylvania for the years 1885-1913, covering, in the first part of the period, the time of the enormous, almost criminal, waste which culminated in 1888, when gas was used as if there would be no end to its production. This was followed by the decline in production, which reached its lowest ebb in 1896, since then, with better management and true ideas concerning the necessity of conservation, the production has gradually increased. The table is an instructive one for students of conservation.

APPROXIMATE VALUE OF NATURAL GAS PRODUCED IN PENNSYLVANIA, 1885-1913.

1885, .	$4,500,000	1891, .	$7,834,016	1897, .	$6,242,543	1903, .	$16,182,834	1909,	$20,475,207
1886, .	9,000,000	1892, .	7,376,281	1898, .	6,806,742	1904, .	18,139,914	1910, .	21,057,211
1887, .	13,749,500	1893, .	6,488,000	1899, .	8,337,210	1905, .	19,197,336	1911, .	18,520,796
1888, .	19,282,375	1894, .	6,279,000	1900, .	10,215,412	1906, .	18,558,245	1912, .	18,539,672
1889, .	11,593,989	1895, .	5,852,000	1901, .	12,688,161	1907, .	18,844,156	1913, .	21,695,845
1890, .	9,551,025	1896, .	5,528,610	1902, .	14,352,183	1908, .	19,104,944		

While most of the production of natural gas in Pennsylvania is from wells that have long passed into the class of small producers, yet there are in most counties wells which still have a good rock pressure.

The following table is simply an approximation of the depth and gas pressure of wells in the State, covering the years 1909-1913. It does not pretend to be of great accuracy.

DEPTH AND GAS PRESSURE OF WELLS IN PENNSYLVANIA, 1909-1913 BY COUNTIES.

County.	Depth, in Feet.	Pressure, in Pounds.				
		1909.	1910.	1911.	1912.	1913.
Allegheny,	900-3,265	10-600	10-600	10- 800	10- 500	15-a1,000
Armstrong,	702-3,450	25-900	3-800	3- 435	5- 900	1- 500
Beaver,	700-2,000	4-600	4- 75	.....	30- 70	30- 510
Butler,	700-3,284	30-600	6-700	4- 800	2- 700	4- 850
Clarion,	600-3,000	8-800	25-900	5- 900	1- 900	2- 800
Elk,	500-3,200	50-990	50-990	40- 900	60- 840	50- a980
Crawford,	550-1,200	1- 85	0- 85	0- 100	2- 160	10- 50
Erie,	300-1,660					
Fayette,	1,750-2,772	100-700	100-650	40- 600	35- 700	35- 700
Cambria,	2,350-2,500					
Forest,	700-2,900	15-145	10-850	6- 150	5- 800	17- 700
Greene,	680-3,600	50-500	40-400	40- 900	60- 575	39- 750
Indiana,	1,100-1,616	.....	.....	.....	.....	600
Jefferson,	700-3,360	10-635	100-700	60-1,200	90-1,000	100- 960
McKean,	750-3,000	30-600	6-600	5- 850	1- 950	3- 800
Mercer,	700-1,500	40	.....	160- 250	190	51- 300
Lawrence,						
Potter,	750-2,200	60-500	50-300	35- 500	10- 360	20- 600
Tioga,	700-1,400	250	300	13- 350	.....	.....
Venango,	350-2,110	20-250	10- 85	10- 500	15- 200	10- 200
Warren,	500-3,290	20- 50	10-190	3- 200	10- 350	5- 280
Washington,	606-3,304	12-500	5-800	5- 600	5- 550	5- 400
Westmoreland,	1,675-3,300	50-180	10- 25	60- 250	15- 20	6-a1,000

aNew well.

CLAY PRODUCTS.

Up until 1913 the value of the clay products in Pennsylvania was only exceeded by that of anthracite and bituminous coal, but in 1913 the value of the cement output very slightly exceeded that of clay products.

Pennsylvania is the second State in the value of its clay products, producing every variety of ware reported, except enamel brick. In 1913 it lead in the value of the brick produced and was fifth in the value of pottery. Pennsylvania is the leading producer in front and fire brick, reporting over one-fourth of the front brick and over two-fifths of the clay fire brick. It is second in the quantity of vitrified paving brick, sewer pipe, stove lining and red earthen ware manufactured, third in the production and value of common brick and in the value of white ware and china, fourth in the value of tile (not drain), and porcelain electric supplies, and fifth in the value of terra cotta.

The total value of clay products in 1913 was $24,231,482, which was 13.37 per cent. of the value of all the clay products of the United States.

The greatest single item in the value of its clay products is fire brick, and,including silica brick, there were manufactured in 1913 over 493,000,000 brick, valued at $9,703,734, or $19.66 per thousand. Of the clay fire brick, Pennsylvania produced 361,548,000, valued at $7,094,794, or $19.62 per thousand. The quantity of clay fire brick produced represented 42.88 per cent. of the entire clay fire production of the country, and 42.2 per cent. of its value. The value of all the fire brick production, including the silica brick, was over 40 per cent. of the total production of clay goods of the State.

The silica brick production represented 75.78 per cent. of the total and 68.37 per cent. of the entire value for the United States.

Philadelphia was, of course, the largest producer of common brick, indeed it is the third producing centre of the United States, and in 1913 there were made over 186,000,000 common brick, valued at $1.353,620. In Allegheny county the production of common brick was 92,430,000, valued at $627,724.

Lawrence county is the largest producer of vitrified paving brick, with Beaver county second and McKean county third.

Armstrong county is the largest producer of front brick, with an output in 1913 of over 70,000,000 brick, valued at over $806,000, about one-third of the production of the State.

Huntingdon county is the largest producer of silica fire brick, having an output of over 70,000,000, nine inch equivalent, brick, or over one-half of the production of the State.

There were 377 active operators reporting for 1913, as compared with 393 in 1912, and 457 in 1909. This decline in the number of operating firms, accompanied by the increased value of production is in common with the rest of the United States.

The following table gives the value of the clay products of Pennsylvania for the years 1909-1913.

CLAY PRODUCTS OF PENNSYLVANIA, 1909-1913.

Product.		1909.	1910.	1911.	1912.	1913.
Brick:						
Common:						
Quantity,		872,658,000	828,703,000	774,122,000	697,023,000	704,493,000
Value,		$5,607,480	$5,371,707	$4,963,232	$4,590,784	$4,772,229
Average per M,		$6.43	$6.48	$6.41	$6.59	$6.77
Vitrified:						
Quantity,		116,735,000	101,330,000	124,125,000	112,372,000	140,467,000
Value,		$1,329,317	$1,204,724	$1,511,061	$1,411,096	$1,814,833
Average per M,		$11.39	$11.89	$12.17	$12.56	$12.93
Front:						
Quantity,		194,695,000	171,415,000	184,569,000	217,328,000	214,734,000
Value,		$2,111,556	$2,001,967	$2,111,492	$2,321,479	$2,325,201
Average per M,		$10.85	$11.68	$11.44	$10.68	$10.83
Fancy or ornamental, ...	Value,	$27,963	$35,768	$44,883	$43,186	$35,446
Enameled,	"	(a)	(a)	(a)	(a)	.....
Fire,	"	$8,107,807	$6,454,928	$5,555,529	$6,178,870	$7,094,794
Stove lining,	"	$97,270	$132,567	$164,848	$138,630	$142,302
Draintile,	"	$14,668	$11,480	$12,779	$12,421	$11,730
Sewer pipe,	"	$445,594	$583,418	$560,869	$829,917	$1,326,971
Architectural terra cotta, ...	"	$428,522	$472,150	$389,000	$569,943	$506,100
Fireproofing,	"	$324,860	$300,187	$309,687	$370,219	$480,675
Tile, not drain,	"	$441,243	$413,047	$358,913	$385,952	$385,322
Pottery:						
Red earthenware,	"	$159,796	$178,348	$159,420	$162,137	$187,625
Stoneware and yellow and Rockingham ware,	"	$297,029	$323,390	$304,998	$281,526	$268,407
White ware, including C. C. ware, white granite ware, semi-porcelain ware, and semi-vitreous porcelain ware,	"	$812,338	(a)	(a)	$902,585	$839,838
China, bone china, delft, and belleek ware,	"	$91,757	$188,122	$216,724	$280,472	(a)
Sanitary ware,	"	$252,951	$254,747	$215,590	$185,000	$153,000
Porcelain electrical supplies,	"	(a)	(a)	(a)	$307,636	$295,908
Miscellaneous,	"	$636,552	$4,167,135	$3,400,068	$2,585,368	$3,591,100
Total value,		$21,186,713	$22,094,285	$20,270,033	$21,537,221	$24,231,482
Number of active firms reporting, ...		457	451	423	393	377
Rank of State,		2	2	2	2	2

aIncluded in "Miscellaneous."

POTTERY.

The year 1913 showed the largest production of pottery of record in the United States. In Pennsylvania, however, there was a slight decline in the value of the output . The total sales reported were $2,046,099, as compared with $2,128,540 in 1912. The greatest falling off was in white ware, including C. C. ware, white granite, semi-porcelain and semi-vitreous porcelain, which declined from $902,582 in 1912 to $839,838 in 1913.

The total production of pottery of all kinds in the United States in 1913 was $37,992,375, being nearly four times the value of the imported ware. In 1913 the total value of the imports increased $621,921, as compared with 1912, while the imports of 1912 decreased $1,083,086, as compared with the preceding year. The proportion of domestic production to the total consumption in 1913 was 79.68 per cent., while it was 81.45 per cent. in 1912. The change from the decline of 10 per cent. in the total quantity of imports to an increase of 6.51 per cent. must be at least in part attributed to the tariff law which went into effect October 4, 1913. The new law is definite in the classification of pottery, and also created a separate class, *earthen ware and crockery composed of a non-vitrified absorbent body.* During the three months the new tariff law was in effect this class of ware was imported to the value of $605,781. The duty on this class of ware is 35 per cent. *advalorem* or 40 per cent. when decorated, while the duty on the same articles under the law of 1909 was 55 per cent. *advalorem.*

The following table shows the value of the several classes of pottery produced in the United States and Pennsylvania in 1912 and 1913.

VALUE OF SEVERAL CLASSES OF POTTERY IN PENNSYLVANIA AND THE UNITED STATES, 1912-1913.

	Number of active firms reporting.	Red earthen ware.	Stoneware and yellow or Rockingham ware.	White ware including C. C. ware, white granite, semi-porcelain ware, and semi-vitreous porcelain ware.	China, bone china delft, and belleek ware.	Sanitary ware.	Porcelain electrical supplies.	Miscellaneous (a).	Total.	Percentage of total.
1912.										
Pennsylvania,	29	162,137	281,526	902,585	280,472	185,000	307,536	9,184	2,128,540	5.83
United States,	c434	958,270	3,919,778	14,829,431	2,177,305	7,902,255	4,927,316	1,789,809	36,504,164	100.00

aIncluding aquarium ornaments, art and chemical pottery, art tile, craquelle, porcelain, falence, Guernsey earthenware, Hampshire pottery, jardinieres, lamps, pins, stilts, and spurs for potters' use, porcelain door knobs, filter stones, shuttle eyes and thread guides, porcelain hardware trimmings, porcelain lighting appliances, razor hones, tobacco pipes, toy marbles, turpentine cups, umbrella stands, and vases.

cIncludes 23 firms not distributed.

	Number of active firms reporting.	Red earthen ware.	Stoneware and yellow or Rockingham ware.	White ware including C. C. ware, white granite, semi-porcelain ware, and semi-vitreous porcelain ware.	China, bone china delft, and belleek ware.	Sanitary ware.	Porcelain electrical supplies.	Miscellaneous (a).	Total.	Percentage of total.
1913.										
Pennsylvania,	27	187,625	268,407	839,838	(a)	153,000	295,908	(a)	2,046,099	5.39
United States,	c426	1,000,529	3,683,567	15,066,811	2,424,060	8,214,838	5,737,741	1,864,829	37,992,375	100.00

aIncluded in "Other States."

cIncludes 21 firms not distributed.

Pennsylvania ranks fifth in the value of its pottery products. Of the various kinds of pottery produced in 1913 in Pennsylvania, white ware, stoneware, sanitary ware and porcelain electrical supplies showed a decrease, while red earthenware and china showed increases. There were but 27 active plants in 1913 as compared with 29 in 1912.

CLAY.

Pennsylvania is the leading State, both in quantity and value of clay mined and sold as such, and in 1913 there was a total production of 479,548 short tons, valued at $836,916. Pennsylvania reported 18.11 per cent. of all the clay sold in the United States in 1913 and 20 per cent. of the total value. Of the total clay output, 87.95 per cent. in quantity is represented by fire clay, which is mainly sold ground and used in the laying up of fire brick and other refractory wares. The quantity of fire clay sold was 421,751 tons, valued at $656,825.

The following table gives the quantity and value of the clay mined and sold in Pennsylvania, and the purposes for which used in 1912 and 1913.

CLAY MINED AND SOLD IN PENNSYLVANIA, 1912 AND 1913, IN SHORT TONS.

Year.	Paper Clay.		Fire Clay.		Brick Clay.		Miscellaneous Clay (a).		Total.	
	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.
1912,	27,003	$154,799	372,944	$537,898	35,756	$31,075	26,251	$16,736	462,605	$741,484
1913,	25,069	148,347	421,751	656,825	12,345	15,705	20,333	15,914	479,548	836,916

aIncluding modeling clay, pipe clay, terra cotta clay, shale and clay for medical use.

STONE.

In 1913 Pennsylvania still continued to be the leading producer of stone, the total production for the year being $10,117,469 in value, and representing 12.08 per cent. of the total for the United States. There were 624 plants reporting for the year.

LIMESTONE.

Pennsylvania continues to be the leading producer of limestone, the total value of the production in 1913 being $6,189,145.

The following table gives the value of the production of the State for 1912 and 1913, arranged according to the purposes for which used.

VALUE OF THE PRODUCTION OF LIMESTONE IN PENNSYLVANIA 1912 AND 1913, BY USES.

Uses.	1912.	1913.
Rough building,	$144,424	$106,690
Dressed building,	1,258	840
Paving,	149,079	129,440
Curbing,	1,465	3,170
Flagging,	.....	85
Rubble,	8,730	8,600
Riprap,	1,745	8,391
Crushed stone:		
Road making,	490,342	585,004
Railroad ballast,	285,312	419,579
Concrete,	407,445	531,889
Flux,	4,361,677	4,206,797
Agricultural,	.....	51,416
Other,	165,831	137,244
Total,	6,017,308	6,189,145

The largest use of limestone in the United States is in the shape of crushed stone for road making, railroad ballast, concrete, etc. The quantity and value used for this purpose in Pennsylvania have been given in the preceding table. In Pennsylvania, however, much the greater portion is used for flux, and in 1912, of the limestone produced in the State, 8,540,211 tons, valued at $4,361,677, were used for this purpose, and in 1913, 8,180,056 tons, valued at $4,206,792, were thus used. This represents more than one-third of the entire amount of stone used for this purpose in the United States in 1913, the total having a value of $11,103,989.

SANDSTONE.

There is less increase in the production of sandstone than of other varieties of stone. This has been due in late years to the use of concrete, crushed sandstone not being used to the same extent as other varieties. The value of the sandstone production in Pennsylvania in 1913, including bluestone, was $1,359,533, which is only exceeded by the output of New York. There was a marked decrease in the production of bluestone in both New York and Pennsylvania. This form of sandstone is an important industry in New York and Pennsylvania, and there was a marked falling off in the production caused by the decrease in public works in the State of New York.

The following table gives the production of sandstones, including bluestone, for the years 1912 and 1913.

VALUE OF PRODUCTION OF SANDSTONE (INCLUDING BLUESTONE) IN PENNSYLVANIA, 1912 AND 1913, BY USES.

Uses.	1912.	1913.
Rough building,	$221,467	$188,986
Dressed building,	239,424	210,192
Ganister,	206,728	283,056
Paving,	31,634	49,174
Curbing,	189,696	144,725
Flagging,	100,339	95,479
Rubble,	38,442	70,744
Riprap,	34,200	28,126
Crushed stone:		
Road making,	81,656	106,533
Railroad ballast,	94,079	71,240
Concrete,	107,588	103,543
Other,	22,348	7,735
Total,	1,367,601	1,359,533

BLUESTONE.

Genuine bluestone is a fine grained, compact, dark blue-gray, argillaceous sandstone, found in southeastern New York and northeastern Pennsylvania. The stone is generally quarried in small quantities by the land owners, and marketed through dealers. It is used for flagging, curbing, sills, lintels, steps and, in recent years, some has been crushed and used in concrete work, more especially for the New York water supply system.

The following table gives the production and uses of bluestone in Pennsylvania for the years 1912 and 1913.

VALUE AND USES OF BLUESTONE PRODUCED IN PENNSYLVANIA IN 1912 AND 1913.

Uses.	1912.	1913.
Building purposes,	$114,296	$118,988
Flagging,	95,223	93,198
Curbing,	116,647	94,625
Crushed stone,	9,593	23,306
Other purposes,	17,702	6,446
Total value,	$353,461	$336,563

SAND AND GRAVEL.

The total production of sand and gravel in 1913 in the United States was 79,555,849 short tons, with a value of $24,217,508. Of this amount 1,791,800 tons was represented by glass sand, with a value of $1,895,991.

The following table gives the production of sand and gravel in the United States and in Pennsylvania for the years 1912 and 1913 by uses.

PRODUCTION OF SAND AND GRAVEL IN THE UNITED STATES AND PENNSYLVANIA IN 1912 AND 1913, BY USES.

	Glass Sand.		Moulding Sand.		Building Sand.		Grinding and Polishing Sand.		Fire Sand.		Engine Sand.	
	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.
1912.												
Pennsylvania,	427,936	$517,383	792,150	$627,532	1,648,996	$789,819	679,155	$399,881	150,068	$111,023	128,162	$78,671
United States,	1,465,386	1,420,471	4,485,380	2,718,726	23,776,013	7,968,127	1,285,863	632,136	455,454	318,742	1,288,616	428,986

	Furnace Sand.		Paving Sand.		Other Sands.		Gravel.		Grand Total.	
	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.
1912.										
Pennsylvania.	.....	.....	304,288	$131,604	457,153	$255,695	1,921,425	$456,905	6,509,333	$3,371,513
United States,	51,446	$27,258	1,788,530	670,080	3,986,288	1,177,035	29,771,585	7,741,017	68,354,561	23,113,208

PRODUCTION OF SAND AND GRAVEL IN THE UNITED STATES AND PENNSYLVANIA IN 1912 AND 1913, BY USES—Continued.

	Glass Sand.		Moulding Sand.		Building Sand.		Grinding and Polishing Sand.		Fire and Furnace Sand.		Engiue Sand.	
	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.
1913.												
Pennsylvania,	513,867	$674,073	730,224	$505,334	2,298,640	$987,810	451,711	$346,685	115,672	$90,687	216,151	$127,257
Uuited States,	1,791,800	1,895,991	3,563,583	2,230,217	25,397,383	8,007,949	941,373	540,399	519,061	364,363	1,033,450	401,806

	Paving Sand.		Railroad Ballast Sand.		Other Sands.		Gravel.		Grand Total.	
	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.
1913.										
Pennsylvania,	283,946	$105,498	.....	.....	148,338	115,167	1,943,900	$429,081	$6,702,449	$3,381.692
United States,	3,335,508	1,020,389	2,335,196	266,852	2,111,997	646,731	38,526,498	8,842,811	79,555,849	24,217,508

The glass sand industry in Pennsylvania in 1913 had a value of $674,073, being about 20 per cent. of the total sand and gravel output of the State. This is one of the factors which makes Pennsylvania the leading State in the output of sand and gravel.

In the quantity of sand and gravel produced, New York ranks first, followed by Illinois, Pennsylvania, Michigan and Ohio. As regards the value of the output, Pennsylvania ranks first, followed by New York, Ohio, Illinois and Michigan, in the order named.

LIME.

The total quantity of lime manufactured in the United States in 1913 was 3,595,390 short tons with a value of $14,648,362, being the largest in the history of the industry. The average price was $4.07 as compared with $3.96 in 1912, and $4.03 in 1911.

The leading states in order of production were Pennsylvania, Ohio, Wisconsin, Virginia and West Virginia. The production of Pennsylvania was 2.37 per cent. of the total while that of Ohio was 1.38 per cent., but the production from Ohio was from 38 plants while that of Pennsylvania represents the output of 494 operations. Many of the lime producers in Pennsylvania are quite small, burning lime for local use for fertilizer purposes. It would seem that the burning of lime in these small quantities is on the decline.

The following table shows the quantity and value of the lime production of the United States for the years 1904-1913.

PRODUCTION OF LIME IN THE UNITED STATES, 1904-1913.

Year.	Quantity.	Value.
	Short tons.	
1904,	2,707,809	$9,951,456
1905,	2,984,100	10,941,680
1906,	3,198,087	12,480,653
1907,	3,092,524	12,656,705
1908,	2,766,873	11,091,186
1909,	3,484,974	13,846,072
1910,	3,505,954	14,088,039
1911,	3,392,915	13,689,054
1912,	3,529,462	13,970,114
1913,	3,595,390	14,648,362

The following table shows the production of lime in each of the several counties of the State, together with the uses of the same.

TABLE SHOWING PRODUCTION OF LIME BY COUNTIES, 1913.

County.	Building.		Alkali Works.		Chemical Works.		Paper Mills.		Sugar Factories.	
	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.
Adams,	14,001	$48,975	.....	.....	2,000	$6,000	3,200	$10,400	.....	.....
Allegheny,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Armstrong,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bedford,	150	528	.....	.....	.....	.....	.....	.....	.....	.....
Berks,	815	2,630	.....	.....	.....	.....	.....	.....	.....	.....
Blair,	110	337	.....	.....	2,150	6,715	7,991	25,233	.....	.....
Bradford,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bucks,	20	100	.....	.....	.....	.....	56	280	.....	.....
Butler,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Center,	3,005	10,336	4,925	15,294	47,445	145,020	29,252	90,822	907	$2,843
Chester,	88,686	373,713	.....	.....	10,000	41,500	10,000	41,500	.....	.....
Clarion,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clinton,	1,000	3,000	.....	.....	.....	.....	.....	.....	.....	.....
Columbia,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumberland,	552	2,157	.....	.....	.....	.....	.....	.....	.....	.....
Dauphin,	189	561	.....	.....	6,274	18,822	.....	.....	.....	.....
Fayette,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin,	26	52	.....	.....	.....	.....	.....	.....	.....	.....
Fulton,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greene,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Huntingdon,	3,129	9,083	.....	.....	2,947	8,528	1,087	3,142	.....	.....
Indiana,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jefferson,	124	310	.....	.....	.....	.....	.....	.....	.....	.....
Juniata,	4	8	.....	.....	.....	.....	.....	.....	.....	.....
Lancaster,	98,900	302,803	.....	.....	.....	.....	.....	.....	.....	.....
Lawrence,	5	25	.....	.....	.....	.....	.....	.....	.....	.....
Lebanon,	494	2,221	.....	.....	6,844	20,532	4,562	13,686	.....	.....
Lehigh,	3,603	15,458	.....	.....	.....	.....	.....	.....	.....	.....
Lycoming,	172	379	.....	.....	.....	.....	.....	.....	.....	.....
Mercer,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mifflin,	100	415	.....	.....	.....	.....	.....	.....	.....	.....
Monroe,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montgomery,	25,749	110,795	.....	.....	1,951	8,325	.....	.....	.....	.....
Montour,	358	918	.....	.....	.....	.....	.....	.....	.....	.....
Northampton,	8,623	39,490	.....	.....	.....	.....	.....	.....	.....	.....
Northumberland,	124	393	.....	.....	.....	.....	.....	.....	.....	.....
Perry,	12	30	.....	.....	.....	.....	.....	.....	.....	.....
Schuylkill,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Snyder,	5	14	.....	.....	.....	.....	.....	.....	.....	.....
Somerset,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union,	216	595	.....	.....	.....	.....	.....	.....	.....	.....
Venango,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Westmoreland,	152	250	.....	.....	.....	.....	.....	.....	.....	.....
York,	39,350	149,717	300	1,128	4,097	13,051	9,711	31,574	20	75.
Total,	289,673	$1,075,293	5,225	$16,422	83,708	$268,493	65,859	$216,637	927	$2,918

TABLE SHOWING PRODUCTION OF LIME BY COUNTIES, 1913.—Continued

County.	Tanneries.		Fertilizers.		Dealers.		Other Purposes.		Total.		Hydrated.	
	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.	Quan.	Value.
Adams,	400	$1,300	7,313	$19,864	.....	.....	160	$480	27,074	$87,019	.....	.....
Allegheny,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Armstrong,	.....	.....	4,062	11,478	.....	.....	.....	.....	4,062	11,478	.....	.....
Bedford,	.....	.....	21,346	46,256	.....	.....	.....	.....	21,496	46,784	.....	.....
Berks,	.....	.....	21,365	53,816	.....	.....	.....	.....	22,180	56,446	.....	.....
Blair,	.....	.....	7,468	20,883	.....	.....	.....	.....	17,719	53,168	439	$2,280
Bucks,	.....	.....	40	180	.....	.....	32	144	148	704	.....	.....
Butler,	.....	.....	8,563	27,825	.....	.....	.....	.....	8,563	27,825	.....	.....
Center,	7,625	23,211	19,359	58,786	9,048	$26,966	3,028	16,658	124,594	389,936	.....	.....
Chester,	7,500	32,250	14,750	62,125	.....	.....	.....	.....	130,936	551,088	.....	.....
Clarion,	.....	.....	756	2,127	.....	.....	.....	.....	756	2,127	.....	.....
Clinton,	.....	.....	1,000	3,000	.....	.....	.....	.....	2,000	6,000	.....	.....
Columbia,	.....	.....	12,697	29,036	3,000	6,750	.....	.....	15,697	35,786	.....	.....
Cumberland,	.....	.....	8,792	18,731	.....	.....	.....	.....	9,314	20,888	.....	.....
Dauphin,	.....	.....	7,519	14,958	.....	.....	13,379	40,137	27,361	74,478	.....	.....
Fayette,	.....	.....	400	500	.....	.....	.....	.....	400	500	.....	.....
Franklin,	.....	.....	3,628	7,490	.....	.....	.....	.....	3,654	7,542	.....	.....
Fulton,	.....	.....	40	100	.....	.....	.....	.....	40	100	.....	.....
Greene,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Huntingdon,	312	898	11,168	30,414	.....	.....	.....	.....	18,643	52,095	.....	.....
Indiana,	.....	.....	336	660	.....	.....	.....	.....	336	660	.....	.....
Jefferson,	.....	.....	2,687	7,067	.....	.....	.....	.....	2,811	7,377	.....	.....
Juniata,	.....	.....	3,557	7,459	15	75	.....	.....	3,576	7,542	.....	.....
Lancaster,	.....	.....	10,368	27,097	.....	.....	.....	.....	109,268	329,900	.....	.....
Lawrence,	.....	.....	15,593	48,513	1,651	4,439	120	342	17,369	53,319	.....	.....
Lebanon,	.....	.....	13,963	28,067	2,281	6,843	13,688	41,064	41,832	112,413	.....	.....
Lehigh,	.....	.....	2,078	4,882	.....	.....	.....	.....	5,681	20,340	.....	.....
Lycoming,	105	221	30,119	64,081	.....	.....	32	80	30,428	65,761	.....	.....
Mercer,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mifflin,	.....	.....	587	1,127	.....	.....	132	632	819	2,174	.....	.....
Monroe,	.....	.....	795	1,670	.....	.....	.....	.....	795	1,670	.....	.....
Montgomery,	3,900	16,640	17,810	67,540	17,441	79,107	5,487	22,771	72,338	305,178	.....	.....
Montour,	3	7	5,193	12,183	5	11	.....	.....	5,559	13,119	.....	.....
Northampton,	94	376	7,015	19,123	.....	.....	.....	.....	15,732	58,989	.....	.....
Northumberland,	.....	.....	9,463	20,046	.....	.....	.....	.....	9,587	20,439	.....	.....
Perry,	.....	.....	3,792	7,382	.....	.....	.....	.....	3,804	7,412	.....	.....
Schuylkill,	.....	.....	48	120	.....	.....	.....	.....	48	120	.....	.....
Snyder,	.....	.....	1,500	2,906	.....	.....	.....	.....	1,505	2,920	.....	.....

Somerset,	.....	.....	5,860	14,400	.....	.....	.....	.....	5,860	14,400	.....	.....
Union,	.....	.....	12,800	26,649	.....	.....	.....	.....	13,016	27,244	.....	.....
Venango,	.....	.....	403	1,210	.....	.....	.....	.....	403	1,210	.....	.....
Westmoreland,	.....	.....	2,373	5,212	.....	.....	.....	.....	2,525	5,462	.....	.....
York,	723	2,413	16,714	47,562	.....	.....	4,053	17,064	74,968	262,584	17,125	68,500
Total,	20,662	$77,316	313,321	$822,555	33,441	$124,191	40,111	$139,372	852,927	$2,743,197	84,239	$374,459

The production from Pennsylvania for the years 1904-1913 is shown by the following table.

QUANTITY AND VALUE OF LIME BURNED IN PENNSYLVANIA, 1904-1913.

Year.	Quantity.	Value.
1904.	567,300	$1,537,673
1905.	620,018	1,672,167
1906.	624,060	1,857,754
1907.	655,166	2,075,842
1908.	582,352	1,883,496
1909.	885,239	2,542,954
1910.	877,714	2,440,350
1911.	841,723	2,688,374
1912.	849,159	2,679,420
1913.	852,927	2,743,197

Since the first records of the production of hydrated lime were compiled in 1906, there has been a marked advance each year. In Pennsylvania in 1906 there were 8 active hydrating plants, which had increased in 1912 and 1913 to 15. The total quantity of hydrated lime made in the United States increased from 120,357 tons in 1906 to 493,269 tons in 1913. The total number of hydrating plants in the United States in 1913 was 80.

There is but little lime burned in Pennsylvania where any other fuel than coal is used. Of the 834 kilns reported in 1913, 701 used coal for fuel, 21 wood, 8 used producer gas, and 19 used coke. There were 76 kilns where both coal and wood were used, and 9 kilns where coal and coke combined was the fuel.

SLATE.

In 1913 the total slate production in the United States had a value of $6,175,476, an increase of 2.19 per cent. over the preceding year. The value of the total output in Pennsylvania was $3,474,247, an increase as compared with 1912 of $259,334, or 7.46 per cent.

As in 1912 the slate production in Pennsylvania was from the counties of Lehigh, Northampton, Lancaster and York.

In 1913, 678,396 squares of roofing slate were sold as compared with 716,770 squares in 1912, but the value of the roofing slate sold was $2,605,882 as compared with $2,528,791 the preceding year. The average price per square in 1912 was $3.53 and in 1913 was $3.84. There was an increase of $0.29 per square in Lancaster county and

$0.21 per square in the "Peach Bottom" slate quarried in York county. The slate quarried in Northampton county for roofing purposes sold at an increased price of $0.44 per square, while there was a decline of $0.02 per square in that quarried in Lehigh county.

Exclusive of black-board stock and school slates, Pennsylvania produced in 1913 52.54 per cent. of the total value and 66.70 per cent. of the total quantity of mill stock. The total quantity of mill stock in 1913 was 4,210,515 square feet, valued at $648,216, as compared with 4,101,200 square feet valued at $552,929 in 1912. The average price per square foot advanced from 14.4 cents in 1912 to 15.4 cents in 1913. The total production of slate of all kinds was 60.46 per cent. of the total in the United States.

In 1913, 6,174,526 school slates were manufactured at a value of $51,313, as compared with 4,482,571 slates in 1912, with a value of $38,852. The average price per thousand in 1913 was however but $8.31, as compared with $8.67 in 1912. The average size of the slate reported is 7x11 inches.

The production of black-board slates in 1913 was 3,504,162 square feet, valued at $426,703, as compared with 2,898,742 square feet valued at $352,109 in 1912. The average price per square foot was $0.12 in 1912 and in 1913 was 12.2 cents. The average thickness of school slates is $\frac{3}{8}$ of an inch.

In 1913 Northampton county produced 77.43 per cent. in quantity and 78.12 per cent. in value of the output of roofing slate in Pennsylvania. The producers in Northampton county reported the demand in 1913 as about the same as in 1912, although the trade was better the first part of the year and poorer in the latter part. The prices reported were generally better than in 1912, while the quantity sold was less.

The demand for structural slate, black-board and school slates, as shown in the table, was greater in 1912 than in 1913, there being an increase in both quantity and value.

In 1913 Lehigh county produced 22.1 per cent. in quantity and 19.69 per cent. in value of the total roofing slate output in Pennsylvania. There was a decrease both in quantity and value of the roofing slate in 1913 as compared with 1912. The demand for roofing slate in the first part of the year was better than in 1912, yet for the entire year the trade was reported dull and demand poor. There was an increase in the value of the mill stock sold, but a decrease in quantity, while black-board and school slate increased both in quantity and value.

There was an increase in average price of the "Peach Bottom" slate produced in York county accompanied by decrease in production.

There was no production or development in 1913 in Dauphin or Carbon counties, although it is reported that further developments will be made during 1914 in Dauphin county.

The following table shows the production of slate in Pennsylvania in 1912 and 1913 by counties, and the several uses to which the same was put.

PRODUCTION OF SLATE IN PENNSYLVANIA IN 1912 AND 1913, BY COUNTIES AND USES.

County.	Number of operators.	Roofing Slate.			Millstock.								Other (value).
					Manufactured.		Rough.		Blackboards.		School Slates.		
		Number of squares.	Value.	Price per square.	Quantity.	Value.	Quantity.	Value.	Quantty.	Value.	Quantty.	Value.	
1912.					sq. ft.		Sq. ft.		Sq. ft.		Number.		
Lancaster,	2	18,135	$99,810	$5 71									
York ("Peachbottom slate"),	3			5 50									
Lehigh,	33	158,603	571,269	3 60	394,419	$53,764	197,930	$19,619	902,697	$101,686	3,109,417	$27,650	
Northampton,	55	540,032	1,857,712	3 44	3,269,099	466,970	239,752	12,576	1,996,045	250,423	1,373,154	11,202	$1,566
Total,	93	716,770	$2,528,791	3 53	3,663,518	$520,734	437,682	$32,195	2,898,742	$352,109	4,482,571	$38,852	$1,566
	$99,810												
	773,988												
	2,600,449												
Total value,	$3,474,247												
1913.													
Lancaster,	2	9,965	$57,059	$6 00									
York ("Peachbottom slate"),	3			5 71									
Lehigh,	31	143,145	513,027	3 58	353,948	$63,632	191,902	$21,193	1,395,847	$147,119	4,126,144	$34,329	$17
Northampton,	54	525,286	2,035,796	3 88	3,116,338	535,284	548,327	28,107	2,108,315	279,584	2,048,382	16,984	1,450
Total,	90	678,396	$2,605,882	$3 84	3,470,286	$598,916	740,229	$49,300	3,504,162	$426,703	6,174,526	$51,313	$1,467
	$57,059												
	779,317												
	2,897,205												
Total value,	$3,733,581												

For the purpose of comparison the following table is introduced, which shows the production of slate in the United States for the years 1909 to 1913.

VALUE OF SLATE PRODUCTION IN THE UNITED STATES, 1909-1913, BY STATES, WITH PERCENTAGE OF INCREASE AND DECREASE.

State.	1909.	1910.	1911.	1912.	1913.	Percentage of increase (+) or decrease (—)
Arkansas,	.....	.....	(a)	(a)	.....	.....
California,	(a)	(a)	.....	.....	.....	.....
Georgia,	(a)	(a)	(a)	.....	(a)	(a)
Maine,	$227,882	$249,005	$263,516	$282,678	$323,998	+14.62
Maryland,	129,538	78,573	76,035	92,184	83,993	— 8.89
New Jersey,	(a)	(a)	(a)	(a)	(a)	(a)
New York,	107,436	84,820	120,359	135,207	144,882	+ 7.16
Pennsylvania,	2,892,358	3,740,806	3,431,351	3,474,247	3,733,591	+ 7.46
Tennessee,	.....	(a)	.....	.....	.....	.....
Vermont,	1,841,589	1,894,659	1,624,941	1,849,975	1,697,820	— 8.22
Virginia,	180,775	148,721	188,808	195,392	175,830	—10.01
Other States,	b61,840	c40,173	d23,009	c13,635	f15,372	+12.74
Total,	$5,441,418	$6,236,759	$5,728,019	$6,043,318	$6,175,476	+ 2.19

a Included in Other States.
b Includes California, Georgia, and New Jersey.
c Includes California, Georgia, New Jersey and Tennessee.
d Includes Arkansas, Georgia, and New Jersey.
e Includes Arkansas and New Jersey.
f Includes Georgia and New Jersey.

FELDSPAR.

The production of feldspar in the United States in 1913 was 120,955 short tons with a value of $776,551, being the largest production of record and also the highest price, the average being about $0.25 more than the year 1911.

The principal uses of feldspar are in the manufacture of pottery, electric porcelains and enameled wares, the most important being pottery, where it is used both in the body and in the glaze. In pottery it acts as a flux. The use of feldspar as a fertilizer has been attempted and at times favorably reported. The use of the raw feldspar requires extremely fine grinding to render it even partially available, at least under ordinary market conditions is prohibitive when compared with potash salts. Attempts to extract the potash from feldspar for fertilizer purposes have not yet been successful commercially.

Pennsylvania ranks fifth among the producers of feldspar in 1913, 9 quarries in Chester and Delaware counties and some smaller ones elsewhere being reported.

The output of feldspar in Pennsylvania in 1913 as reported to the Topographic and Geologic Survey, showed an increase over that of 1912, both in the total amount sold and in the value of the same. There was a falling off in the amount sold ground of 1,600 short tons, but an increase in price of 65 cents per ton. The amount sold in crude form increased 1,700 tons, and the average price per ton was slightly more than double that of the previous year.

The following table shows in tabular form the details of the production for the years 1912 and 1913.

PRODUCTION OF FELDSPAR IN PENNSYLVANIA, 1912 AND 1913.

	1912.			1913.		
	Quantity short tons.	Value.	Per ton.	Quantity short tons.	Value.	Per ton.
Sold crude,	947	$4,985	$2 56	3,685	$19,454	$5 24
Sold ground,	7,504	66,302	8 84	5,944	56,397	9 49
Total,	9,451	$71,287	.....	9,629	$75,851	.....

MICA.

The total value of mica produced in the United States in 1913 was $436,060. The production was from eleven states, North Carolina, New Hampshire, Idaho, New Mexico, South Dakota, South Carolina, Alabama, Virginia, Pennsylvania, Colorado and New York, named in the order of the value of their output. There was no production reported from Pennsylvania in 1912 and but one producer in 1913. This being the case, it is impossible to give any details regarding the value of the output. The production reported is from Delaware county.

TALC AND SOAPSTONE.

The total production of talc and soapstone in the United States in 1913 was 175,833 short tons.

The following table gives the quantity and value of the output from the year 1904 to 1913.

PRODUCTION OF TALC AND SOAPSTONE IN THE UNITED STATES, 1904-1913, IN SHORT TONS.

Year.	Quantity.	Value.
1904,	91,189	$940,731
1905,	96,634	1,082,062
1906,	120,644	1,431,556
1907,	139,810	1,531,047
1908,	117,354	1,401,222
1909,	130,338	1,221,959
1910,	150,716	1,592,393
1911,	143,551	1,646,018
1912,	159,270	1,706,963
1913,	175,833	1,908,097

Owing to the small number of producers it is impossible to separate the output of Pennsylvania. Combined with the production from New Jersey in the same immediate district, the output of talc in 1913 was 11,308 tons, valued at $80,780, as compared with 10,400 tons, valued at $50,519, in 1912.

The production in Pennsylvania and also in New Jersey is from the neighborhood of Easton. This region has been fully described in the report of the Topographic and Geologic Survey of Pennsylvania, No. 5.

SILICA.

Silica or quartz is used in the manufacture of pottery, paints, scouring soaps, wood filler and also a polisher. In pottery, silica (called flint by the potter) diminishes shrinkage in the body of the ware. It is also an important ingredient in glazes. For pottery purposes silica must not contain more than one-half of one per cent. of iron bearing minerals. Large quantities of silica are used in the manufacture of paint. For the above purposes either quartz, sands, sandstone, or massive crystalline quartz may be used.

The total production of silica in the United States in 1913 was 97,902 tons, valued at $201,488. It is impossible to separate the production from Pennsylvania, which was quite small, but combined with North Carolina and Tennessee the output was 67,039 tons, with a value of $42,426.

There were but two operators in Pennsylvania reporting in 1913, the Columbia Flint Co., with a quarry near Bendersville, Adams county, and the H. T. A. Rhodewalt Co., with a quarry at Comog Station, Chester county. The output was less than in 1912.

There was a small production of rotten stone used for abrasive purposes reported in 1913.

ABRASIVE MATERIALS.

There were two producers of millstone in Pennsylvania in 1913, and one producer of infusorial earth (rotten stone).

The production of millstone is from Lancaster county. It is reported that near Slatington in Lehigh county there is a deposit of material suitable for the best of oil stones, but this has not been worked. No production of garnet was reported. There was a production in recent years from near Chelsia and Chester, in Delaware county.

The production of "rotten stone" came from Lycoming county and but little is known of the deposit.

PYRITES.

There was no production of pyrite reported from Pennsylvania in 1913. For a number of years there has been a small output recovered from some of the coal mines in the northwest portion of the State.

There is no reported production of sulphuric acid as a by-product from ores mined within the State.

SALT AND BROMINE.

It is impossible to give any details of the salt, bromine and calcium chloride production in 1913. The entire production is from wells in the North Side (Allegheny), Pittsburgh, which produce salt water from the Berea sandstone. The products consist of salt, bromine and calcium chloride. The small output at present is in marked contrast to the early history of the industry in the State.

GRAPHITE.

In 1913 the total producton of graphite in the United States was 4,775 short tons of natural graphite, valued at $293,756, and 6,817 short tons of artificial or manufactured graphite, valued at $973,397. During the same year 28,879 short tons of graphite valued at $2,109,791 were imported.

Notwithstanding the large quantities of graphite in the United States the industry is in a very unsatisfactory condition. While this is in part due to the quality of the domestic graphite and the relative high cost of labor as compared with labor in Ceylon, the greatest cause is the difficulty of the separation of the graphite from the accompanying minerals especially the mica with which it is closely associated. The technology of concentrating graphite is not satisfactory.

For a thorough discussion of the graphite deposits of the United States, and more especially of Pennsylvania, and the uses of graphite, reference should be made to Report No. 6 of the Pennsylvania Topographic and Geologic Survey Commission.

There were only two plants in operation in Pennsylvania during 1913. Pettinos Bros. operated their plant near Byers for a portion of the year, until their plant was destroyed by fire in August. The Graphite Products Co. leased the plant of the Pennsylvania Graphite Co. near Byers, and operated the same for a portion of the year. In addition to these two plants near Byers, there was a production near Chester Springs by the Rock Graphite Mining and Manufacturing Company. It is reported there will be additional operations in 1914.

The difficulty in the production of Pennsylvania graphite lies in the separation from the accompanying materials, and as yet no satisfactory method has been devised for this purpose, notwithstanding the investment of very large sums of money in the attempt. Until a satisfactory method of separation is devised, there cannot be any marked increase in the Pennsylvania product.

MINERAL WATERS.

In 1912, 41 springs or wells producing mineral waters were reported from Pennsylvania, with a total production of 2,192,106 gallons, with a value of $204,906. In 1913 there were 41 springs or wells reporting, with a production of 2,163,931 gallons, with a value of $190,459. The

slight increase in number of springs reporting with a decrease in the value of the sales was in harmony with the general reports throughout the United States.

The maximum production of mineral waters in the United States was in 1909, since then there has been a decrease in the volume of the business and in the value, notwithstanding an increase in the number of springs reporting. This increase has been accompanied also by a tendency towards a lower price, which means a decrease sale of the higher priced waters and an increase sale of the lower price ones, in other words, an increase in the use of table waters and a decrease in medicinal waters. The decrease in Pennsylvania is probably due to the installment of municipal purification plants, which has been followed by a decrease in the sale of spring waters.

Of the total quantity of mineral waters produced in Pennsylvania in 1913, 342,639 gallons were used in the manufacture of soft drinks

The following table shows the production and value of mineral waters in Pennsylvania from the years 1909-1913.

PRODUCTION AND VALUE OF MINERAL WATERS IN PENNSYLVANIA, 1909-1913.

Year.	Commercial Springs.	Quantity sold.	Value.	Average price per gallon.
		gallons.		cents.
1909,	42	2,177,967	$240,856	11
1910,	44	2,536,337	221,685	9
1911,	41	2,327,732	216,819	9
1912,	41	2,192,106	204,906	9
1913,	43	2,163,931	190,459	9

In connection with the 41 springs reporting sales in Pennsylvania in 1913 there were 11 resorts accommodating 1,650 guests, and 7 establishments for giving mineral water baths were maintained.

The following are the 41 springs reporting sales in 1913:

Bartlett Spring, Cambrige Springs, Crawford county.

Bedford Mineral Springs, near Bedford, Bedford county.

Carnegie Alkaline and Lithia Mineral Spring, Carnegie, Allegheny county.

Chadwick Spring, Cambridge Springs, Crawford county.

Cloverdale Lithia Spring, near Newville, Cumberland county.

Cold Spring, Lotell, Lebanon county.

Colonial Spring, Montgomery county, near Valley Forge.

Colvin White Sulphur Spring, Sulphur Springs, Bedford county.

Crystal-Cray Spring, Warren, Warren county.

De Profundus Spring, Saegertown, Crawford county.

Duquesne Vichy Spring, Swissvale, Allegheny county.

East Mountain Lithia Spring, near Factoryville, Wyoming county.
Franklin Lithia Spring, Cambridge Springs, Crawford county.
Glen Crystal Spring, Harbour Creek, Erie county.
Glen Summit Spring, Glen Summit Springs, Luzerne county.
Gray Mineral Spring, Cambridge Springs, Crawford county.
Harrison Valley Mineral Spring, Harrison Valley, Potter county.
Hutchinson's Spring, East Brook, Lawrence county.
Kecksburg Artesian Mineral Spring, Kecksburg, Westmoreland county.
Keystone Spring, near Taylorsville, Bucks county.
Massassauga Mineral Spring, Erie, Erie county.
Minnequa Spring, Canton, Bradford county.
Mount Laurel Spring, Temple, Berks county.
Original Magnesia Springs, Cambridge Springs, Crawford county.
Pavilion Spring, Wernersville, Berks county.
Petticord Spring, Cambridge Springs, Crawford county.
Plymouth Crystal Spring, Plymouth, Luzerne county.
Pocono Mineral Spring, near Wilkes-Barre, Luzerne county.
Polar Springs, Morrisville, Bucks county.
Prospect Rock Spring, Laurel, Luzerne county.
Pulaski Natural Mineral Spring, Pulaski, Lawrence county.
Puritas Spring, near Erie, Erie county.
Quaill Farm Spring, Bellevue, Allegheny county.
Ross Common Spring, Ross Common, Monroe county.
Sizerville Spring, Sizerville, Cameron county.
Springfield Spring, Springfield township, Delaware county.
Summer Hill Spring, Pittsburgh, Allegheny county.
Thurston's Carbonate Spring, Meadville, Crawford county.
Tuckahoe Mineral Spring, near Northumberland, Northumberland county.
Unamis Mineral Spring, Unamis, Somerset county.
Whann Lithia Spring, Franklin, Venango county.

CEMENT.

The year 1913 was marked in the cement industry by a large increase in production of Portland cement and also an increase in the average price per barrel. The total production of cement of all kinds was 92,949,102 barrels, with a value of $93,001,169. Of this total over 92,000,000 barrels was Portland cement.

The average price of Portland cement in the United States in 1913 was a trifle less than $1.005 compared with $0.813 in 1912. This

value is at the mills, in bulk, and does not include the value of the sacks or barrels. This average price throughout the United States was about 16.7 cents higher than the average for the Lehigh district, the higher average price being due to the value of cement on the Pacific Coast. The average value of Portland cement was $5.92 per long ton, and in the Lehigh district $4.94 per long ton.

Pennsylvania produced in 1913, from 23 plants, 28,701,845 barrels of Portland cement and shipped 28,060,495 barrels. The total value of the Portland cement shipped was $24,268,800, the average price being $0.865.

The Lehigh region, embracing a portion of Pennsylvania and the plants in New Jersey, still continues to be the largest cement region in the United States. There were 22 active plants in 1913. The total shipments from the Lehigh region were 26,659,537 barrels, with an average price of $0.838 per barrel, as compared with 26,013,891 barrels in 1912, of an average value of $0.674 per barrel, there being an increase in the average price of more than 24 per cent.

The plants of western Pennsylvania and Ohio are grouped together and in this grouping there were 9 active plants in 1913, shipping 7,287,028 barrels, as compared with 7,398,753 barrels in 1912. The average price in 1913 was $1.00 per barrel, as compared with $0.757 per barrel in 1912, an average increase in price of more than 32 per cent.

The history of the Portland cement industry in the United States has been marked by an enormous increased output accompanied by a continuing decrease in price. The cost of a cement plant is quite large, the material is heavy and freight rates to market are relatively high, so that the region served by any plant is necessarily circumscribed. Many plants have been built where the materials were not suitable, at least for manufacture at the price demanded by competitive plants, and consequently much money has been wasted in the industry. A recent review of the subject by Mr. Charles Catlett, president of the Security Cement and Lime Company, published in the Cement Era of January, 1914, says, "The consumption will continue to grow, and it is to be hoped that the industry is getting on a firmer financial basis. This has not been true for a number of years, some thirty odd cement companies having gone into the hands of receivers. These receiverships have been partly due to bad promotion, location and management, but more largely from a fundamental misconception of the profits in the business, and a failure to recognize the true or commercial cost. This has been coupled with a failure to recognize the great difference in raw material and the high cost and the long time necessary before a new plant can expect to operate on a normal basis, and finally, promoters of new plants overlook the fact that the sudden interjection of their output

immediately breaks their own local market. These facts have been borne in upon the banking and investment public, and new development will probably only be made, and should be made, where the market requires it."

In the Lehigh cement region one is struck with the changes which have taken place in the methods of manufacture and it is evident that much valuable machinery has been discarded on account of obsolescence, which is an element stated to be almost certain when cost has not been taken into consideration in the fixing of the prices in the past. What should be added to the actual factory cost for this item is not agreed upon by experts in the cement business. Undoubtedly the experience of the past would suggest a much greater sum than is justified with plants built within the last few years. It is undoubtedly the case that a good many of the cement mills of the country are equipped with machinery which is largely out of date, but at the prevailing prices it has not been possible to replace the obsolete machinery, which is an item of cost and not properly one of investment.

There was but one plant in Pennsylvania producing natural cement in 1913 and it is therefore impossible to give any details of the production. There were four plants in New York producing natural cement, and the output of New York and Pennsylvania was but 255,709 barrels, with a value of $114,067. The natural cement industry has shown a continuous decline since 1902, the production in 1913 being the lowest on record since 1880, when the exact figures were first available.

There are four plants in the United States producing Puzzolan or other slag cements. One of these is situated in Pennsylvania at Sharon. The total output of these four plants in 1913 was 107,313 barrels of a total value of $97,663. This was an increase of 15,500 barrels over the output of 1912.

SAND LIME BRICK.

The production of sand lime brick in 1913 showed a marked increase over the output of the preceding year. In 1912 three plants were operated in Pennsylvania, producing 6,365,000 common brick, of a value of $36,970. In 1913 three plants produced 11,984,000 common brick, with a value of $73,674. Pennsylvania was the sixth state in value of the sand lime brick in 1913. There was one idle plant in the State. The active plants were in Dauphin, Lackawanna and Lebanon counties.

The total number of sand lime brick plants in the United States in 1913 was 68, producing 178,352,000 common brick, and 11,307 front brick, with a total value of $1,238,325.

COPPER.

The total production of copper (smelter output) in the United States in 1913 was 1,224,484,098 pounds, of which Pennsylvania produced 503,792 pounds, with a value of $78,078. The greater part of this output is a by-product separated from the magnetic iron ore of the Cornwall mines in Lebanon county. At the Cornwall mines the pyritiferous magnetite is treated in a thousand ton concentrator by the Gröndahl process, resulting in a briquetted copper bearing pyrite and in a high grade magnetite.

There is still some development work taking place in the South Mountain region in Adams and Franklin counties, near the Maryland line. A short account of the development in this region will be found in the biennial report of this Survey for 1912-14. Notwithstanding the great amount of development work done in this region no deposit of copper has been found that will justify working, and no one should invest money in that region without understanding the fact that all expenditures in the past have been in vain. There has been no recent work done in the State in the other copper bearing areas.

IRON ORE.

While Pennsylvania has lost its ranking position as a producer of iron ore yet in 1912 there were mined 517,081 long tons, and in 1913 489,056 long tons. In 1912, 522,172 long tons of ore were marketed, with a value of $481,353, and in 1913, 478693 long tons were marketed with a value of $589,038.

Of the ore mined in 1913, 34,041 tons were brown ore and hematite and 455,015 tons were magnetite.

MINERAL PAINTS.

Pennsylvania produces almost one-half of the natural mineral pigments of the United States. The total production of mineral pigments in 1913 was $522,410. It is impossible to give the details of the production of all classes of pigments in Pennsylvania without disclosing individual output.

The total production of the United States in 1913 showed a decrease of $39,283 in value, almost 7 per cent. What, if any, portion of this decline, instead of the increase which should have been expected in harmony with most of the other mineral products, is due to the change in tariff it is impossible to say The most important clause in the new tariff bill affecting the mineral pigment industry of Pennsylvania is that which applies to ocher, sienna and umber. The tariff on these items being fixed at 5 per cent. advalorem.

OCHER.

The total production of ocher in the United States in 1913 was $173,944, of which total Pennsylvania produced $32,175. This was a slight increase in Pennsylvania over the production of 1911 and 1912, but was less than the output of 1910. The relative output of Pennsylvania in 1913 was much less than in preceding years.

In 1913 ocher was produced in Georgia, Pennsylvania, Virginia, Alabama, California, Iowa and Vermont, the output being in the order named. The production from Pennsylvania was from Berks, Northampton and Lehigh counties, being 22 per cent. of the total of the United States.

UMBER AND SIENNA.

Umber consists of iron and aluminum silicates, with varying quantities of manganese oxide. The raw umber is of a drab color, becoming reddish brown on burning, when it is known as burnt umber. Pennsylvania reported the only production of umber in 1913, and it is impossible to give the figures of production without disclosing individual output.

Sienna is closely related to umber, but contains a smaller quantity of manganese oxide. Umber is mined in three localities in Pennsylvania, at Quaker Hill, Northampton county; Doylestown, Bucks county, and Bethel, Berks county. In each case the umbers are closely associated with deposits of ocher. The production of sienna in the United States in 1913 was from Pennsylvania and California, the production of both umber and sienna being 776 tons, with a value of $20,790.

METALLIC PAINT.

The marketed output of metallic paint in 1913 was 30,098 tons, with a total value of $171,264. Of this amount, Pennsylvania produced 8,312 tons, with a value of $106,172. The average price in Pennsylvania was $12.77 per ton, while the average for the United States

was very much lower, being less than $6.00 per ton. This difference in price is due to the superior quality of the Pennsylvania product, which is mainly derived from beds of gray siderite, found near Lehigh Gap.

MORTAR COLORS.

There was a marked decrease in the quantity and value of mortar colors in 1913. The total output in the United States was 5,357 tons, with a value of $35,433. It is impossible to give the details of production in Pennsylvania. In previous years the production from this State has been approximately one-third of the total.

SLATE AND SHALE.

The total production of slate and shale ground for pigments in 1913 in the United States was 21,786 tons, with a value of $120,969. Of this total over 9.3 per cent. was from Pennsylvania. In this State the shales used can be divided into black, yellow and red shales. The black shales are sold under the name of "Mineral Black" and many sources of supply are available. Black shale is used to some extent for paint, but mainly in the manufacture of black filler for iron work. Yellow shales occur at many places throughout the State. Their principal use is in the manufacture of oilcloth and linoleum. They are frequently called ochers, but generally contain less iron than true ochers, and are lighter in color. Red shales are used in the manufacture of paints.

For detailed information reference should be made to Report No. 4 of the Topographic and Geologic Survey.

PRODUCTION BY COUNTIES.

In presenting the following brief statements of the mineral production of each of the several counties for 1913, it is realized that they are far from perfect. This is of course due to a number of reasons. The individual returns of production as made to the Geological Survey are private, and are not made for publication, it being distinctly understood, both by the Survey and the producer, that the same can only be used for compilation into State and county totals. It therefore necessarily follows that in any county where there is an output of a mineral by less than three producers that it is impossible to give the production of that particular mineral.

The conditions attending the petroleum and natural gas industry are such as to render it practically impossible to give with accuracy.

the output from each county. The oil of many producers is derived from more than one county and yet the same is run together, and the individual output from each county cannot be separated. In the case of natural gas this difficulty is even greater, for the gas from different fields and pools is necessarily mixed in the distributing pipes, and the separate value cannot be accurately ascertained. Of course there are many producers of natural gas where the product is sold to the larger distributing companies, or where it is a small company supply a limited area, where the exact amount and value of the gas can be ascertained, but in the case of the larger companies deriving their gas from several counties, it has as yet been impossible to separate the county value.

Notwithstanding these limitations it is believed that the following brief statements concerning the production from each of the counties will be of interest.

ADAMS COUNTY.

The mineral production of Adams county in 1913 had a total value of $257,715. The total value of the output in 1912 was $209,689, the increase being $48,026, or 23 per cent. There was a marked increase in the value of lime and limestone produced, the former increasing over $20,500, and the latter over $12,500 in value. There was also an increase in trap rock, and an increase of almost $15,000 in the value of the brick and tile manufactured. There was a slight decrease in the value of the feldspar and quartz produced.

ALLEGHENY COUNTY.

The mineral production of Allegheny county in 1913 had a total value of $29,427,230. This total does not include the value of the petroleum and natural gas produced, nor does it include the value of the coke manufactured. This total value is about $4,000,000 in excess of the output for 1912.

Brick and tile were produced to a value of $2,193,642. Over 3,000,000 tons of sand and gravel were produced, with a value of $947,275. The bituminous coal mined was 20,117,823 short tons, as compared with 18,867,265 short tons in 1912, and the total value was $23,158,897, as compared with $20,528,181 in 1912.

Sand was produced to a value of $69,040, as compared with a production of $72,388 in 1912. Mineral waters were sold to the value of $7,256.

The other mineral products produced were crushed stone (used for abrasives), clay, salt, bromine, chloride of lime, cement and limestone., with a combined value of $3,049,120. It is impossible to give

the details of these latter items without disclosing the value of individual output. The total output of Allegheny county was about 6.5 per cent. of the total production of the State.

ARMSTRONG COUNTY.

The total mineral production of Armstrong county in 1913 had a value of $7,118,240. This total does not include the value of the petroleum and natural gas produced in the county, which it has been impossible to separate from the State totals.

There was a slight decline in the value of the brick and tile produced, the total being $1,077,219, as compared with $1,089,067, in 1912.

There was a marked increase in the amount of coal mined, which rose from 4,104,989 short tons in 1912 to 5,321,622 short tons in 1913. The total value of the coal mined in 1913 was $5,476,228.

There was a sharp decline in the amount of limestone quarried, which fell from $287,156 in 1912 to $116,541 in 1913. Lime was burned to the value of $11,478.

The sand and gravel produced in 1913 had a value of $137,421, as compared with $147,145 in 1912.

The other products reported were clay, pottery and sandstone, which had a combined output to the value of $299,353. It is impossible to give the figures regarding these items without disclosing the value of individual output.

BEAVER COUNTY.

The total mineral production of Beaver county in 1913 had a value of $2,318,196, exclusive of petroleum and natural gas, which it has been impossible to separate from the State totals, nor does this total include the value of the coke manufactured, which is a derived product, produced from coal mined outside of the county.

Brick and tile were produced to the value of $1,356,868, as compared with $1,202,140 in 1912. Clay was sold to the value of $47,849, as compared with $40,402 the preceding year.

There was but little difference in the value of the coal produced, there being 248,585 short tons in 1913, as compared with 247,465 short tons in 1912. The value of the coal mined in 1913 was $337,372, as compared with $309,304 in 1912.

There was a small decline in the value of the pottery produced, the value for 1913 being $394,047, as compared with $408,842 in 1912.

The other minerals produced were sand and gravel, sandstone and limestone, which combined had a value of $182,060. It is not practicable to give the details of production of these items without disclosing individual output.

BEDFORD COUNTY.

The total value of the mineral production of Bedford county in 1913 was, for the first time, more than $1,000,000, the total being $1,144,031. In 1912 the total value of the mineral production was $991,550, the net increase being over 5 per cent.

There was a healthy increase in the value of the clay and clay products produced, but the greatest individual increase was in the value of the bituminous coal, which rose from $795,031 in 1912 to $927,379 in 1913, or over 16 per cent. There was an increase in the quantity of coal mined of almost 120,000 tons.

There was also a marked increase in the value of the limestone quarried and in the sandstone produced, accompanied by a slight decline in the value of the lime and mineral waters. The value of the coke made is not included in these figures as this is a derived product.

BERKS COUNTY.

The value of the production of minerals in Berks county in 1913 was $1,339,715, as compared with $1,203,937 in 1912, an increase of $135,778 in value, and more than 11 per cent.

The following table gives the value of the several products for 1912 and 1913.

Mineral Production of Berks County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$360,464	$378,460
Clay,	37,786	43,194
Sand and gravel,	70,327	59,730
Trap rock,	529,320	640,063
Limestone,	84,450	88,408
Lime,	58,919	56,446
Miscellaneous,*	62,671	73,414
Total,	$1,203,937	$1,339,715

*Includes: Mineral paints, iron ore, granite, sandstone, mineral waters.

BLAIR COUNTY.

The year 1913 was a prosperous one for the mineral producers of Blair county, there being an increased production reported in almost every line. The total value of the mineral production was $2,087,249, as compared with $1,879,809, an increase of $207,440, or over 11 per cent.

The following table shows in detail the value of the production for the years 1912 and 1913.

Mineral Production of Blair County, 1912 and 1913.

	1912.	1913.
Bituminous coal,	$378,511	$463,225
Sandstone,	39,597	81,750
Limestone,	1,149,091	1,164,014
Lime,	57,266	53,168
Miscellaneous,*	255,344	325,092
Total,	$1,879,809	$2,087,249

*Includes: brick and tile, clay, sand and gravel, iron ore.

BRADFORD COUNTY.

The only mineral production in Bradford county in 1913 consisted of bluestone, limestone and mineral waters, the combined production being less than the total output of bluestone in 1912. Owing to the few producers it is impossible to give the details of production without disclosing individual output.

BUCKS COUNTY.

There was a marked increase in the output of minerals in Bucks county in 1913, as compared with any previous year, the total value being $500,710, as compared with $391,431 in 1912. This was an increase of 28 per cent., and the first time that the figures of production reached above the half million dollar mark.

The following table gives in detail the production for the years 1912 and 1913.

Mineral Production of Bucks County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$207,872	$258,411
Granite,	2,723	9,751
Trap rock,	101,386	151,969
Sandstone,	3[illegible],833	25,148
Miscellaneous,*	46,617	55,431
Total,	$391,431	$500,710

*Includes: Clay, sand and gravel, pottery, bluestone, limestone, mineral waters, lime.

BUTLER COUNTY.

The value of the mineral production of Butler county in 1913 was $1,890,234, excluding the value of petroleum and natural gas. The value of the petroleum produced was about $2,750,000. It is impracticable to separate the production of natural gas from the total for the State.

There was a large increase in the value of brick and tile produced, which in 1913 was $214,536, as compared with $122,909 in 1912. There was a slight increase in the amount of coal mined, which rose from 1,000,947 tons in 1912 to 1,080,002 tons in 1913. The total value in 1913 was $1,210,524, as compared with $1,131,503 in 1912.

There was a slight falling off in the sand and gravel produced, the total value for 1913 being $87,819, as compared with $96,401 in 1912.

There was a sharp decline in the limestone quarried and the lime produced. The value of the limestone quarried fell from $539,097 in 1912 to $339,458 in 1913, and the value of the lime burned from $67,636 in 1912 to $27,825 in 1913.

The value of the sandstone quarried in 1913 was $10,072, a marked increase over the value for the preceding year.

CAMBRIA COUNTY.

The value of the mineral production of Cambria county in 1913 reached $23,322,656, as compared with $20,502,069 in 1912, the increase being $2,820,587, or 13.75 per cent. There was an increase in the value of all minerals reported. Sand and gravel and trap rock appear in the list for 1913, both being absent in 1912. Coke and pig iron are not included in these figures as they are derived products.

The following table gives in detail the value of the several minerals produced, so far as the same can be given without disclosing individual production, for the years 1912 and 1913.

Mineral Production of Cambria County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$1,238,874	$1,321,639
Clay,	55,747	87,046
Bituminous coal,	19,200,293	21,903,291
Miscellaneous,*	7,150	10,680
Total,	$20,502,069	$23,322,656

*Includes: Sandstone, sand and gravel, trap rock.

CAMERON COUNTY.

There was a decrease in the total value of the mineral output of Cameron county in 1913 of 10 per cent., as compared with 1912. This was not confined to any one mineral but was generally distributed over all the items.

The products reported were brick and tile, bituminous coal and mineral waters. There was also a good production of coke, which is a derived product. Owing to the small number of producers it is impossible to give the detailed figures of the output. The total for the county was $62,377, as compared with $70,631 in 1912.

CARBON COUNTY.

The mineral production of Carbon county in 1913 included mineral paints, brick and tile, anthracite coal, sand and gravel, and sandstone, the value of the anthracite coal largely exceeding all others combined. The total output had a value of $7,069,643, as compared with $6,110,610, an increase of almost one-sixth. It is impossible to give the details of production without disclosing individual output. The anthracite coal mined was 3,066,314 tons, as compared with 2, 568,305 tons in 1912, the value being $6,905,498 in 1913, as compared with $5,998,394 in 1912, an increase of almost $1,000,000.

CENTRE COUNTY.

The total value of the mineral production in Centre county in 1913 was $2,605,835. In 1912 the total value was but $2,189,908, the increase for 1913 being over $400,000 in value, or 19.5 per cent.

There was a marked increase in the value of the brick and tile manufactured and in the amount of clay sold. The amount of coal mined showed an increase of over 200,000 tons in quantity, and over $200,000 in value. There is but little change in the value of the quarry products.

The following table will show in detail the quantity and value of the products produced in 1912 and 1913 so far as the same can be given without disclosing individual output.

Mineral Production of Centre County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$363,848	$507,659
Clay,	31,951	44,201
Bituminous coal,	1,292,301	1,499,395
Limestone,	147,479	152,149
Lime,	332,430	389,936
Miscellaneous,	21,899	12,495
Total,	$2,189,908	$2,605,835

*Includes: Sand and gravel, iron ore, sandstone.

CHESTER COUNTY.

There was a falling off in the total value of the mineral production of Chester county in 1913 of $105,000. This decline was not confined to any one product but was quite general, being in contrast with most of the counties in the State and with the State as a whole.

The following table gives in detail the various products so far as the same can be given without disclosing individual production.

Mineral Production of Chester County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$202,863	$186,278
Feldspar and quartz,	87,267	66,473
Limestone,	163,038	174,881
Lime,	613,250	551,088
Miscellaneous,*	340,784	323,319
Total,	$1,407,202	$1,302,039

*Includes; Clay, sand and gravel, pottery, iron ore, graphite, granite, trap rock, sandstone, marble, mineral waters, mineral paints.

CLARION COUNTY.

The total mineral production of Clarion county in 1913 had a value of $1,764,504. This is exclusive of the value of petroleum and natural gas, which it is impracticable to separate from the State totals.

The value of the brick and tile manufactured in 1913 fell from $226,489 in 1912 to $149,170 in 1913, while the value of the clay mined rose from $23,584 in 1912 to $41,185 in 1913.

There was a marked increase in the coal mined, both in quantity and value. The total quantity mined in 1912 was 1,199,322 short tons, which rose in 1913 to 1,427,848 short tons. The value in 1912 was $1,223,537, which rose in 1913 to $1,517,316.

The other minerals reported were sand and gravel, pottery, limestone and lime, which combined had a total value of $56,833. It is impracticable to separate these items without disclosing the value of individual output.

CLEARFIELD COUNTY.

The mineral production of Clearfield county showed a marked gain in 1913 as compared with 1912. The value of the production in 1913, excluding coke, which is a derived product, was $11,450,685, as compared with $10,691,481 in 1912, a gain of $759,204 in value, or slightly

more than 7 per cent. It is to be noted that each of the several products in Clearfield county showed a distinct gain over the year 1912.

The following table shows the value of the several products for the years 1912 and 1913, except where individual output would be disclosed.

Mineral Production of Clearfield County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$2,250,983	$2,616,191
Clay,	182,699	214,726
Bituminous coal,	8,230,763	8,573,446
Miscellaneous,*	27,036	46,322
Total,	$10,691,481	$11,450,685

*Includes: Sand and gravel, sandstone.

CLINTON COUNTY.

The value of the mineral production of Clinton county in 1913, for the first time, exceeded $1,500,000. There was a marked increase in the value of the brick and tile manufactured and in the coal mined, there being a falling off, however, in some of the other products.

The following table gives the details of production in 1912 and 1913 so far as the same is possible without disclosing individual output.

Mineral Production of Clinton County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$873,741	$1,054,490
Clay,	50,936	36,896
Bituminous coal,	427,192	441,249
Miscellaneous,*	61,360	56,716
Total,	$1,413,229	$1,589,351

*Includes: Mineral paints, sand and gravel, sandstone, bluestone, limestone, lime.

COLUMBIA COUNTY.

The mineral production of Columbia county showed a decline in 1913, as compared with 1912, of over $125,000. This is in marked contrast with most of the counties in the State and to the State as a whole, which showed a very distinct increase in value.

The products reported from Columbia county were brick and tile, anthracite coal, sand and gravel, pottery, limestone, and lime for the year 1913. Mineral waters, which was reported in 1912, does not appear in the list for 1913.

It is impossible to give the details of production without disclosing individual output.

CRAWFORD COUNTY.

The mineral production of Crawford county in 1913 had a value of $45,203. To this must be added the value of the petroleum and natural gas produced, which it is impracticable to separate from the State totals, but which in the aggregate exceeded $80,000. This is the largest mineral production reported from Crawford county.

The minerals reported were sand and gravel, sandstone and mineral waters. The value of the mineral waters reported was $28,084, as compared with $29,493 in 1912.

The sand and gravel and sandstone produced had a total value of $17,119 in 1913, as compared with $10,259 in 1912.

CUMBERLAND COUNTY.

The mineral production of Cumberland county in 1913 was $205,311 in value. This was a decline of $10,000 from the value of the output in 1912. There was a slight increase in the value of the brick and tile, sand and gravel, and limestone produced, and a corresponding decrease in the value of the clay, lime and mineral waters. It is impossible to give the details of production without disclosing the individual output.

DAUPHIN COUNTY.

The mineral production of Dauphin county in 1913 was $2,739,771 in value, as compared with $2,557,242 in 1912. These figures do not include the production of coke, which is a derived product, and had a slight increase in value as compared with the previous year.

The following table gives in detail the production of the several products so far as the same can be given without disclosing individual output.

Mineral Production of Dauphin County, 1912 and 1913.

	1912.	1913.
Anthracite coal,	$2,001,018	$2,120,440
Sand and gravel,	30,533	19,476
Limestone,	158,735	197,823
Lime,	70,612	74,478
Miscellaneous,*	296,344	327,554
Total,	$2,557,242	$2,739,771

*Includes: Brick and tile, sand and lime brick, trap rock, sandstone.

DELAWARE COUNTY.

According to reports received by the State Geological Survey the total value of the mineral production in Delaware county in 1913 was $822,676, as compared with $663,841 in 1912. This shows an increase of $158,835 in value, or 24 per cent. These figures do not include the value of coke manufactured, which is a derived product, produced from coal mined elsewhere.

The following table shows the value of the principal items produced in 1913, as compared with 1912, so far as the same can be given without disclosing individual output.

Mineral Production of Delaware County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$294,962	$299,337
Granite,	184,248	297,112
Trap rock,	150,713	182,428
Miscellaneous,*	33,918	45,799
Total,	$663,841	$822,676

*Includes: Sand and gravel, feldspar and quartz, sandstone, mineral waters, mica.

ELK COUNTY.

The total value of the mineral production of Elk county in 1913, excluding petroleum and natural gas, was $2,445,083, as compared with $2,152,453 in 1912.

The value of the brick and tile produced in 1913 was $1,159,136, as compared with $988,308 in 1912.

There was a slight increase in the value of the coal produced, which rose from 1,146,496 short tons in 1912 to 1,201,065 short tons in 1913. The value in 1913 was $1,251,090, as compared with $1,132,363 in 1912.

The other minerals reported were clay, sand and gravel, and sandstone, which combined had a total production in 1913 of $34,857. It is impossible to give the details of these items without disclosing individual output.

There was a falling off in the amount of petroleum produced, but owing to the increased price, the value of the total showed a marked increase. It is impossible to give the details of the production of petroleum and natural gas as they cannot be separated from the State totals.

ERIE COUNTY.

The total value of the mineral production of Erie county in 1913, excluding the value of natural gas, was $283,392.

The minerals reported were brick and tile, sand and gravel, and mineral waters. There was a slight decline in the value of the brick and tile manufactured, with a corresponding increase in the value of the sand produced. There was a decline in the value of the mineral waters, but it is impossible to give the details of production without disclosing individual output.

The total value of the output of Erie county in 1912 was $296,542.

FAYETTE COUNTY.

The total value of the mineral production of Fayette county in 1913, exclusive of natural gas, was $38,906,843. This total does not include the value of the coke manufactured, which was made from coal, the value of which is included in the total given.

There was a marked increase in the value of the brick and tile manufactured, which rose from $615,875 in 1912 to $802,375 in 1913.

There was but a slight difference in the quantity of coal mined in 1913 as compared with 1912, the total for 1913 being 32,607,963 short tons, as compared with 32,366,567 short tons in 1912. There was, however, a marked increase in the value of the coal, which rose from $32,595,745 in 1912 to $37,810,508 in 1913.

The value of the sand and gravel produced in 1913 was $113,408, as compared with $90,268 in 1912, and the value of the sandstone quarried rose from $11,887 to $26,273 in 1913.

There was a marked increase in the value of the limestone quarried, which was $143,234, as compared with $100,634 in 1912.

The other products reported were clay, pottery, bluestone, and lime, which had a combined value of $11,045. It is impossible to separate these items without disposing the individual output.

It is impossible to separate the value of natural gas produced from the State total.

FOREST COUNTY.

The only mineral production reported from Forest county in 1913, as in 1912, was petroleum and natural gas.

There was but little difference in the output of petroleum reported, the total as near as can be ascertained from the reports received, being 186,000 barrels, with a value of $473,000, as compared with 184,000 barrels, with a value of $302,000 in 1912.

It is impossible to separate the production of natural gas from the total production of the State with the degree of certainty desired.

The conditions attending the piping of natural gas render it almost impossible to separate the output from the different counties, and at the best there is a large element of uncertainty concerning the value of this output in any limited area. From the reports received the value of the natural gas output from Forest county in 1913 is estimated as between $200,000 and $250,000, but as stated, this is a mere estimate based on those returns which are accurate and an arbitrary division of the remaining production in the State.

FRANKLIN COUNTY.

The total value of the mineral production of Franklin county in 1913 was $40,544, a decrease of $3,430 from the output of 1912. The products reported include brick and tile, sand and gravel, limestone, lime and sandstone. Sandstone does not appear among the products quarried in 1912.

It is impossible to give the details of production without disclosing the value of the individual output.

FULTON COUNTY.

The mineral production of Fulton county in 1913 was quite small. There was a small amount of coal produced and some lime was burned, but it is impossible to give the value of these products without disclosing individual output.

GREENE COUNTY.

There was but little difference in the mineral production of Greene county in 1913, as compared with the preceding year, aside from the increased output of bituminous coal.

There was apparently a small decline in the amount of petroleum produced, but, owing to the increased prices prevailing, there was a marked increase in the value. It is impossible to give the details of this production as it cannot be definitely separated from the State totals.

The quantity of bituminous coal mined in 1912 was 35,839 tons, with a value of $36,819. In 1913 the total quantity mined was 316,752 tons, with a total value of $321,001.

The other products reported were brick and tile, sandstone and limestone. The value of the coke produced is not included in the mineral production as this is a derived product, and the coal is included in the quantities given.

HUNTINGDON COUNTY.

The mineral production of Huntingdon county in 1913 reached the high water mark, the total value being $3,445,807, as compared with $2,824,328 in 1912. This showed an increase of $621,579 in value, or 22 per cent. These figures do not include the coke manufactured, which is a derived product.

The following table gives in detail the production for the years 1912 and 1913 so far as the same can be done without disclosing individual outpnt.

Mineral Production of Huntingdon County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$1,146,396	$1,439,295
Bituminous coal,	1,025,646	1,060,367
Sand and gravel,	291,484	569,166
Sandstone,	136,159	159,010
Limestone and lime,	163,351	163,825
Miscellaneous,*	61,292	54,144
Total,	$2,824,328	$3,445,807

*Includes: Clay, pottery, iron ore, trap rock.

INDIANA COUNTY.

The value of the mineral production of Indiana county in 1913 was the greatest of record, exceeding $10,500,000 in value. As compared with 1912 the output showed an increase of $1,493,192 in value, or over 16 per cent. This does not include the value of the coke manufactured, which is a derived product.

The production of bituminous coal rose from 9,174,927 net tons in 1912 to 10,204,184 net tons in 1913, and the value at the mines from $8,872,019 in 1912 to $10,297,482 in 1913. There was a marked increase in the value of the clay sold and brick and tile made. A sharp decline in the value of the sandstone quarried was reported.

JEFFERSON COUNTY.

The mineral production of Jefferson county in 1913 had a value of $5,926,673. This value is exclusive of the petrolenm and natural gas produced, which it is impossible to separate from the State totals, and of the coke manufactured, which is a derived product from coal included in the above total.

The value of the brick and tile manufactured in 1913 was $162,022, ase compared with $193,835 in 1912.

The bituminous coal mined was 5,801,864 short tons, as compared with 5,416,536 short tons in 1912, and the value was $5,794,490, as compared with $5,168,998 the preceding year.

There was a marked increase in the value of the sand and gravel produced, and also in the sandstone quarried, this increase being about 50 per cent. There was a slight decrease in the limestone quarried and in the value of the lime burned, but it is impossible to give the detail figures of these items without disclosing the value of individual output.

JUNIATA COUNTY.

There was but little difference in the value of the mineral output of Juniata county in 1913 as compared with 1912, the total value being $9,321, as compared with $9,031 in 1912. As in 1912, the mineral output consisted of brick and tile, limestone and lime. There was a slight decline in the value of the brick and tile and limestone and a slight increase in the value of the lime burned. It is impossible to give the details of production without disclosing individual output.

LACKAWANNA COUNTY.

The total value of the mineral production in Lackawanna county in 1913 was $49,169,988, as compared with $43,722,632 in 1912, an increase of $5,447,356, or 12.5 per cent.

The products reported in 1913 consist of brick and tile, anthracite coal, sand and gravel, sand lime brick, and sandstone.

There was an increase in the total quantity of anthracite coal mined of almost 1,000,000 tons, and the increase in the value of the same was over $5,000,000. There was an increase in the value of the brick and tile made, the sand and gravel and the sandstone quarried. It is impossible to give the details of the figures without disclosing individual output.

LANCASTER COUNTY.

The total value of the mineral production of Lancaster county in 1913 was $712,931, as compared with $687,968 in 1912. The largest individual items of production were limestone and lime, each of which showed a substantial increase. It is impossible to give the details of production without disclosing the value of individual output in some cases, and therefore in the following table some of the products are grouped.

Mineral Production of Lancaster County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$130,473	$79,283
Sand and gravel,	44,083	54,664
Limestone,	205,157	226,133
Lime,	287,938	329,900
Miscellaneous,*	20,317	22,951
Total,	$687,968	$712,931

*Includes: Abrasives, clay, pottery, trap rock, slate granite.

LAWRENCE COUNTY.

The mineral production of Lawrence county in 1913 had a total value of $5,287,114. This is exclusive of the production of petroleum and natural gas, which combined had a total value of almost $500,000.

The value of the brick and tile manufactured was $561,676, as compared with $581,862 in 1912.

There was some increase in the value of the bituminous coal produced, of which 94,283 net tons were mined, as compared with 75,823 net tons in 1912. The value of the coal mined in 1913 was $118,835.

Sand and gravel showed an increase over the preceding year, there being 53,346 tons produced, with a total value of $27,170.

In 1913 the cement produced was in excess of the preceding year by 170,000 barrels. The average price showed a marked increase over the preceding year, so that the total value of the cement produced showed an increase of 33 per cent.

There was a marked decline in the value of the sandstone quarried, which fell from $81,663 in 1912 to $51,078 in 1913. There was also a small decline in the value of the limestone quarried, which fell from $1,615,210 in 1912 to $1,532,866 in 1913. In contrast with the output of limestone there was an increase in the value of the lime burned, from $41,947 in 1912 to $53,419 in 1913.

There was a marked increase in the production of petroleum. It is impossible to separate the production from the State totals with entire accuracy, but approximately 180,000 barrels were produced in 1913, with a total value of more than $450,000.

The other products reported were mineral paints, clay, pottery, and mineral waters, with a combined value of $289,636. It is impossible to separate these items without disclosing the value of individual output.

LEBANON COUNTY.

In 1913 the mineral production of Lebanon county had a value of $989,193, as compared with $821,452 in 1912. This does not include the value of the coke produced, which is a derived product made from coal mined outside of the county.

There was a marked increase in the value of the iron ore, sand and gravel, limestone and lime produced, with a slight decline in the output of brick and tile and sandstone. It is impossible to give the details of the production without disclosing individual output.

LEHIGH COUNTY.

In 1913 the total mineral production of Lehigh county was $8,062,694, as compared with $5,872,137 in 1912. This was an increase of $2,190,557, or more than 37 per cent.

There was an increase of over 1,000,000 barrels in the quantity of cement sold, which is the greatest factor in the mineral production of Lehigh county.

The following table gives the details of the production for the years 1912 and 1913, so far as the same can be done without disclosing individual output.

Mineral Production of Lehigh County, 1912 and 1913.

	1912.	1913.
Brick and tile,	$219,645	$213,336
Sand and gravel,	367,872	37,521
Cement,	4,282,085	6,756,315
Slate,	773,988	779,317
Lime,	23,431	20,340
Miscellaneous,*	205,116	255,865
Total,	$5,872,137	$8,062,694

*Includes: Mineral paints, clay, iron ore, sandstone, limestone, mineral waters.

LUZERNE COUNTY.

The mineral production of Luzerne county in 1913 had a value of $78,922,886, as compared with $69,749,155 in 1912. This represents an increase of $9,173,731 in value, or more than 13 per cent. Luzerne county is the leading mineral producing county in Pennsylvania, the value of its mineral output being more than 15 per cent. of the entire production of the State.

There was an increased output of anthracite coal reported of over 3,000,000 gross tons, with a corresponding increase in value. The total mined was 31,552,976 gross tons, with a value of $78,542,286. The brick manufactured had a value of $186,942, and sandstone was quarried to the value of $130,723. The other products produced were mineral paints, sand and gravel, trap rock and mineral waters. It is impossible to give the details of production without disclosing individual output.

LYCOMING COUNTY.

The mineral production of Lycoming county in 1913 consisted of mineral paints, brick and tile, bituminous coal, sand and gravel, sandstone, bluestone, limestone and lime, and rotten stone. These had a combined value of $210,541, as compared with $172,575 in 1912. It is impossible to give the details of production without disclosing the value of individual output.

McKEAN COUNTY.

The total value of the mineral production of McKean county in 1913, aside from that of petroleum and natural gas, was $734,651, as compared with $572,620 in 1912.

Much of the greater portion of this increase was in the value of the brick and tile manufactured, which in 1913 had a value of $716,326, as compared with $556,304 in 1912. The other items reported were clay, bituminous coal, sandstone and blnestone, which had a combined value of $18,325. It is impossible to give the details of these items without disclosing individual output.

There was but little change in the production of petroleum as far as quantity was concerned, the returns for 1913 showing approximately 33,000 barrels more than in 1912. The increase in value was upwards of $1,400,000. Owing to the character of the reports received it is impossible to tabulate the production of oil as closely as other mineral products, or to separate the same by counties with the accuracy which is desirable.

MERCER COUNTY.

The total value of the mineral production of Mercer county in 1913 was $1,136,447, as compared with $1,320,131 in 1912. These figures do not include the value of petroleum and natural gas produced, which combined had a value of approximately $100,000. It is impossible to separate these two items from the State totals with the degree of accuracy which is desirable.

The production of bituminous coal in 1913 fell off somewhat, which is in contrast with the rest of the bituminous region of the State. The total output in 1913 was 777,601 tons, as compared with 846,228 tons in 1912. The total value fell from $1,052,367 in 1912 to $960,624 in 1913.

In 1913, 67,311 tons of sand and gravel were produced in the county, as compared with 81,690 tons in 1912. The value of this output fell from $64,638 in 1912 to $40,783 in 1913. There was a slight increase in the value of the sandstones quarried, from $30,650 in 1912 to $32,139 in 1913.

The value of the coke produced in the county is not included in these figures, as coke is a derived product and the value of the raw coal is therefore taken.

The other products reported were brick and tile, clay and cement, which combined had a value of $102,901. It is impossible to give the figures concerning these items without disclosing individual output, but in the combined value there was a marked decline.

Pyrite, limestone and mineral waters which were produced in 1912 do not appear on the records for the year 1913.

MIFFLIN COUNTY.

The mineral production of Mifflin county in 1913 had a value of $284,092, while that of 1912 was but $202,322. The total increase was $81,770, or 40 per cent.

The greatest increase was in the amount of limestone quarried, which, in 1912, had a value of $54,225, which increased in 1913 to $190,040. There was a slight increase in the value of the lime burned, accompanied by a decrease in the value of the brick and tile and pottery manufactured. There was also a decrease in the value of the sand and gravel produced from $106,945 in 1912 to $87,778 in 1913.

MONROE COUNTY.

The total value of the mineral production of Monroe county in 1913 was $38,358, a decline of $18,000 from the reported value in 1912. The products reported were brick and tile, sandstone, lime and mineral waters, the same as in 1912, with a small production of limestone. It is impossible to give the details of production without disclosing the value of individual output.

MONTGOMERY COUNTY.

The total value of the mineral production in Montgomery county in 1913 was $1,081,019, as compared with $888,789 in 1912, an increase in value of $192,230, or almost 22 per cent. This increase was pretty generally distributed over all the articles produced.

The value of the brick and tile manufactured increased from $196,646 in 1912 to $206,762 in 1913. The value of the granite quarried increased almost 100 per cent., being $47,952 in 1912 and $94,055 in 1913. The greatest increase in production was that of trap rock, which was almost three times the output of 1912, having increased from $34,864 to $104,039 in 1913. The value of the limestone quarried increased from $180,193 in 1912 to $248,559 in 1913, and the value of the lime burned from $304,753 in 1912 to $305,178 in 1913.

The other products reported were clay, sand and gravel, pottery, sandstone, marble and mineral waters. The combined output of marble, sandstone, pottery, sand and gravel, and clay was less than in 1912. The mineral waters produced, however, was an entirely new product, the same not having been reported in 1912. It is impossible to give the detail figures in reference to these latter products without disclosing individual output.

MONTOUR COUNTY.

The mineral production of Montour county in 1913 had a value of $22,908, as compared with a corresponding value of $17,679 in 1912. The products reported were brick and tile, sand and gravel, limestone and lime. It is impossible to give the details of production of the several items without disclosing individual output.

NORTHAMPTON COUNTY.

The year 1913 marked a high record in the value of the mineral production of Northampton county, the total value of the reported products being $15,432,009, as compared with $13,282,738 in 1912. This increase, $2,149,271, represents over 16 per cent. of the total of the preceding year. These figures do not include the value of the coke manufactured, which is a derived product, and made from coal mined outside of the county.

The greatest increase was in the cement sold, the quantity decreasing in 1913 slightly over 200,000 barrels, but the increased value of the cement sold was $1,750,000.

The following table gives the details of the several products so far as the same can be done without disclosing individual production.

Mineral Production of Northampton County, 1912 and 1913.

	1912.	1913.
Mineral paints,	$120,310	$123,290
Brick and tile,	93,154	96,394
Cement,	10,081,026	11,839,750
Slate,	2,600,449	2,897,205
Limestone,	211,565	251,523
Lime,	60,492	58,989
Miscellaneous,*	115,742	164,853
Total,	$13,282,738	$15,432,009

*Includes: Granite, natural cement, marble, talc and soapstone, sand and gravel.

NORTHUMBERLAND COUNTY.

The total value of the mineral production of Northumberland county in 1913 was $14,918,604, as compared with $14,641,111 in 1912, an increase of $270,000.

The amount of anthracite coal produced was 6,268,188 gross tons, as compared with 6,030,088 tons in 1912, with a coresponding increase in value from $14,441,226 in 1912 to $14,694,630 in 1913.

The value of the brick manufactured in 1913 was $110,741, as compared with $101,496 in 1913, an increase of over $9,000, almost 10 per cent. There was also a slight increase in the value of the lime burned.

The other products reported were sand and gravel, trap rock, and limestone. It is impossible to give the figures of production of these items without disclosing individual output. There was also a slight production of mineral waters reported in 1913.

PERRY COUNTY.

There was but little difference in the value of the mineral production of Perry county in 1913, as compared with 1912. The products reported were sand and gravel, limestone and lime in 1912. In 1913 there was a slight output of clay reported. It is impossible to gives the details of production in Perry county without disclosing the value of individual output.

PHILADELPHIA COUNTY.

The total mineral production of Philadelphia county in 1913 had a value of $2,972,344, as compared with $2,591,379 in 1912. The increase reported was $380,965 in gross value, almost 15 per cent.

There was but slight increase in the value of brick and tile manufactured, which in 1913 was $2,074,083, as compared with $2,016,584 in 1912. The marked increase was in the granite quarried, which rose from $273,417 in 1912 to $636,703 in 1913.

The other products reported were sand and gravel and pottery. It is impossible to give the details in regard to these items without disclosing individual output.

PIKE COUNTY.

As in previous years the only mineral product reported from Pike county in 1913 was bluestone. The stone quarried had a value of $101,585, as compared with $94,709 in 1912. This is in somewhat sharp contrast with the reports of stone quarried in most other portions of the State.

POTTER COUNTY.

There was but little change in the value of the mineral production of Potter county in 1913, as compared with that of the preceding year. The minerals reported were bluestone and mineral waters, as in 1912, together with a small output of sandstone in 1913.

According to reports received there was some increase in quantity in the production of petroleum, and a marked increase in value, owing to the higher prices prevailing in 1913 as compared with the previous year. Owing to the imperfection of the reports received it is impossible to give the details of this production with the certainty desired.

SCHUYLKILL COUNTY.

The mineral production of Schuylkill county in 1913 had a total value of $39,314,817, as compared with $37,417,018 in 1912.

The quantity of anthracite coal mined was 17,355,874 tons, with a value of $39,224,218, as compared with 16,055,848 gross tons, with a value of $37,332,871 in 1912.

The other products reported were brick and tile, sandstone and lime. It is impossible to give the detail figures without disclosing the individual output.

SNYDER COUNTY.

The total mineral production of Snyder county in 1913 was slightly less than in 1912. The only mineral products reported in 1913 were lime and a small output of anthracite coal. Iron ore and limestone, which appeared on the list for 1912, were missing in the year 1913. It is impossible to give the details of the figures without disclosing the value of the individual output.

SOMERSET COUNTY.

There was a slight increase in the value of the mineral production of Somerset county in 1913 as compared with 1912.

The amount of coal mined in 1913 was 9,928,776 tons, as compared with 9,888,144 tons in 1912. The value of the coal mined in 1913 was $11,119,355, as compared with $11,034,445 in 1912.

There was an increase in the value of the brick manufactured of $20,000, the total for 1913 being $144,906, as compared with $124,735 in 1912.

The other products reported were clay, sand and gravel, sandstone, limestone, lime and mineral waters. It is impossible to give the details of these small items without disclosing the value of individual output.

SULLIVAN COUNTY.

The only mineral production in Sullivan county in 1913 consisted of anthracite coal, of which 592,913 gross tons were mined, with a value of $1,141,943. In 1912 579,673 gross tons were mined, with a value at the mines of $1,115,135.

There was a slight production of sand and gravel reported in 1912, but the same was not found in the returns for 1913.

SUSQUEHANNA COUNTY.

There was in 1913 a decline in the value of the mineral production of Susquehanna county from the preceding year. The total value of the mineral output in 1912 was $1,308,808, which in 1913 fell to $1,242,428.

Brick and tile, which appeared in the list for 1912, was absent in 1913, and limestone, which was absent in 1912, appeared in 1913. The only other product reported was bluestone, in which there was a sharp decline from the preceding year. It is impossible to give the details of production without disclosing the value of individual output.

TIOGA COUNTY.

There was but little difference in the value of the mineral production of Tioga county in 1913 as compared with 1912.

There was a slight falling off in the output of bituminous coal. In 1912 there was an output of coal of 997,787 tons, which fell in 1913 to 943,748 tons. The value of the output in 1912 was $1,569,289, which fell in 1913 to 1,544,537.

In 1913 as in 1912 the only other products reported were clay and petroleum. It is impossible to give the figures concerning the production of these items without disclosing individual output, but there was very little change in value from the preceding year.

UNION COUNTY.

The total mineral production of Union county in 1913 had a value of $32,101, as compared with a total value of $31,298 in 1912.

The products reported from Union county consist of mineral paints, limestone and lime, as in the year 1912. It is impossible to give the details of production without disclosing the value of individual output.

VENANGO COUNTY.

Aside from petroleum and natural gas the mineral production of Venango county in 1913 showed a slight increase in value.

The largest item (aside from petroleum and natural gas) consisted of sand and gravel, of which 150,603 tons were produced in 1913, as compared with 125,015 tons in 1912. There was a corresponding increase in value from $100,634 in 1912 to $132,243 in 1913.

The other products reported were sandstone, mineral waters and a small output of lime. It is impossible to give the details of the production of these items without disclosing individual output, the difference in value from the preceding year, however, was very small.

From the reports received there was a slight increase in the production of petroleum, amounting to approximately 66,000 barrels in quantity. Owing to the higher prices prevailing the value of the output as reported showed a marked increase from $2,000,000 in 1912 to $3,400,000 in 1913. Owing to the character of the reports received these figures are not as accurate as is desired, but relatively the figures are of the same degree of accuracy. It is impossible to separate the production of natural gas from the State totals.

WARREN COUNTY.

Aside from the output of petroleum and natural gas, the value of the mineral production of Warren county in 1913 showed a marked increase over that of the preceding year.

The only products reported were brick and tile, sand and gravel, and mineral waters, which combined had a value of $89,534, as compared with $80,093 in 1912. It is impossible to give the details of this production without disclosing the value of individual output. According to the reports received there was a slight increase in the quantity of petroleum produced. Due to the increased prices prevailing during the year the value of the petroleum output was upwards of $1,060,000, as compared with $680,000 in 1912. Owing to the character of the reports as received it is impossible to give the details of the county production of petroleum with the accuracy that is desired. It is impossible to separate the value of the natural gas produced in Warren county from the State totals.

WASHINGTON COUNTY.

The mineral production of Washington county in 1913 showed a marked increase over that of the preceding year. Excluding petroleum and natural gas, the total value in 1913 was $21,409,977, as compared with 18,893,859 in 1912.

The value of the brick and tile manufactured in 1913 was $298,317, as compared with $288,214 in 1912.

There was an increase in the quantity of bituminous coal mined, there being an output of 18,309,317 net tons, as compared with 16,645,127 net tons in 1912. The value of the output in 1913 was $20,497,946, as compared with $18,012,167 in 1912.

The other products reported were pottery, sandstone, limestone, and sand and gravel, with a combined output of $613,514. This is a marked increase over the preceding year, but it is impossible to give the details of production without disclosing the value of individual output. The value of the coke produced is not included in these values as it is a derived product and the value of the coal coked is included in the totals.

From the reports received there was an increase of about 25,000 barrels in the amount of petroleum produced, and owing to the high prices prevailing an increase of approximately $500,000 in the value of this product. Owing to the character of the reports as received it is impossible to give the total petroleum production with the accuracy that is desirable. It is impossible to separate the production of natural gas from the State totals.

WAYNE COUNTY.

The total mineral production of Wayne county in 1913 was $43,118, more than twice the reported value of the output in 1912. This increase in the value of the production was due to an output of anthracite coal which was reported in 1913 but was not on the list for 1912. The other products reported were sand and gravel and bluestone. It is impossible to give the details of production from Wayne county without disclosing the individual production.

WESTMORELAND COUNTY.

There was an increase in the total value of the mineral production of Westmoreland county in 1913, as compared with 1912, of almost $6,000,000. The total value reported in 1913, excluding natural gas, was $38,007,164, as compared with $32,288,581 in 1912. This total does not include the value of the coke produced, as this is a derived product and the value of the raw coal is therefore taken. The total production of coke in 1913 was $6,373,404 tons, with a total value of $14,461,099.

The value of the brick and tile manufactured in 1913 was $864,074, as compared with $528,942 in 1912.

The output of bituminous coal was 33,258,702 short tons, as compared with $30,589,549 short tons in 1912, and the value in 1913 was $36,490,802, as compared with $30,971,778 in 1912. There was thus a marked increase in the total quantity of coal mined, and, what is of even more interest, an increase in the average price per ton.

There was a slight increase of 3,000 tons in the quantity of sand and gravel produced, the total being 169,994 tons. There was a decline, however, of $10,000 in the value of the sand and gravel, the total sales in 1913 being $188,624.

The sandstone quarried fell from $10,080 in 1912 to $3,664 in 1913, and the limestone from $244,669 to $211,311. There was also a decline in the lime burned from 4,974 tons in 1912 to 2,525 tons in 1913, with a corresponding decrease in value from $10,361 to $5,462 in 1913.

The other products reported were clay, pottery, bluestone, and a small output of mineral waters, with a combined total value of $243,227. There was a slight increase in the amount of clay sold but a decrease of 20 per cent. in the value of the pottery produced, and the value of the bluestone quarried was less than one-eighth that of 1913. The production of mineral waters is quite small.

It is impossible to give with accuracy the value of the natural gas produced in Westmoreland county, or to separate the same from the State totals.

WYOMING COUNTY.

The only mineral products from Wyoming county were bluestone and mineral waters, which combined were produced to a value of over $100,000, as compared with $51,947 in 1912. This increase in the total mineral production was due to the value of the bluestone quarried, which was almost double the quantity in 1912. It is impossible to give the details of production without disclosing individual output.

YORK COUNTY.

There was a slight falling off in the value of the mineral production of York county in 1913, as compared with 1912.

The value of the brick and tile manufactured fell from $122,065 in 1912 to $80,267 in 1913. The value of the limestone quarried rose from $132,668 in 1912 to $192,784 in 1913, and that of lime manufactured from $232,026 in 1912 to $262,584 in 1913.

The other products reported were sand and gravel, pottery, cement, slate, sandstone and iron ore. It is impossible to give the figures regarding the production of these items without disclosing individual output. Trap rock and bluestone, which were reported in the year 1912, did not appear in the list for 1913, and sandstone and iron ore, which were absent in the year 1912, again appear in the list of products for 1913.